

EDUCATIONAL POLICIES IN NIGERIA: ACHIEVEMENTS, CHALLENGES AND PROSPECTS

A Book of Readings in Honour of

Professor Hauwa Imam



EDITED BY

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VOL. 1

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Prof. Kabiru Mohd Badau

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Volume 1

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PREFACE

Education remains one of the most powerful instruments for national development, social transformation, and human empowerment. In Nigeria, educational policies have continued to play a crucial role in shaping the direction of the nation's education system, guiding reforms, promoting access, ensuring quality, and responding to emerging global and local realities. Over the years, various policies and programmes have been formulated to address the evolving needs of Nigerian society. While notable achievements have been recorded, significant challenges still persist, thereby necessitating continuous scholarly reflection and policy dialogue.

This book, *Educational Policies in Nigeria: Achievements, Challenges and Prospects*, is a collection of scholarly articles that examine critical issues surrounding the formulation, implementation, and outcomes of educational policies in Nigeria. The chapters in the book provide diverse perspectives on curriculum reform, funding and financing of education, inclusive education, teacher professional development, monitoring and evaluation, gender equity, ICT integration, artificial intelligence in education, technical and vocational education, and several other contemporary themes shaping the Nigerian educational landscape.

The contributions presented in this book bring together insights from scholars, researchers, and practitioners across different institutions and disciplines. Through empirical studies, theoretical analyses, and policy critiques, the authors highlight both the progress made in the Nigerian education sector and the persistent obstacles that continue to hinder the effective implementation of policies. More importantly, the chapters offer practical recommendations and pathways for strengthening educational policies and improving educational outcomes in Nigeria.

Educational Policies in Nigeria: Achievements, Challenges and Prospects is a book of readings published in honour of **Professor Hauwa Imam**, a distinguished scholar, educationist, and policy expert whose contributions to the development of education in Nigeria have been profound and far-reaching. Over the years, Professor Imam has distinguished herself through her scholarship, mentorship, and commitment to educational reform. Her work in areas such as early childhood education, educational policy, teacher development, and inclusive education has significantly influenced research, policy formulation, and educational practice in Nigeria and beyond. The book, therefore, serves as a profound appreciation of her remarkable academic legacy and enduring impact in the field of education.

The thirty-six chapters (split into two volumes: Volume 1 and Volume 2), as earlier noted, explore a wide range of issues including curriculum development and reform, policy implementation, educational funding, teacher training, guidance and counselling,

gender equality, inclusive education, monitoring and evaluation, science and technology education, as well as emerging innovations such as artificial intelligence and digital learning tools. Together, these contributions offer a comprehensive reflection on the past, present, and future of educational policies in Nigeria.

It is our hope that this book will serve as a valuable resource for policymakers, education administrators, researchers, teachers, and students who are interested in understanding the dynamics of educational policy in Nigeria. The insights and recommendations presented here are intended to stimulate further research, inform policy decisions, and contribute to the ongoing efforts to strengthen the Nigerian education system.

Finally, we express our profound appreciation to all the contributors who devoted their time and expertise to the preparation of their chapters. Their scholarly commitment has made this volume possible. We also extend our sincere gratitude to all individuals and institutions who supported the production of this book in honour of Professor Hauwa Imam.

We trust that readers will find this book intellectually stimulating and practically useful in advancing discussions on educational policies and reforms in Nigeria.

Prof. Kabiru Mohd Badau
Dr. Nneka Cynthia Ohaeri
Dr. Victor Ekwukoma
Dr. Stella Nwankwo
Dr. Evelyn Ijeoma Orji

FOREWORD

It gives me immense pleasure and a deep sense of professional fulfilment to write the foreword to this important book titled *Educational Policies in Nigeria: Achievements, Challenges and Prospects*, a book of readings published in honour of **Professor Hauwa Imam**, an accomplished scholar, respected colleague, and distinguished educationist.

Education policy occupies a central place in the development of any nation. In Nigeria, the formulation and implementation of sound educational policies have remained critical to addressing the numerous challenges confronting the education sector while also responding to emerging global trends. Over the years, the Nigerian education system has undergone several reforms aimed at expanding access, improving quality, promoting equity, and strengthening the relevance of education to national development. However, as this book rightly demonstrates, the journey towards achieving these objectives has been marked by both significant progress and persistent challenges.

This book is therefore timely and highly relevant. The chapters in the book offer rich scholarly reflections on diverse aspects of educational policy in Nigeria. The contributors, who are seasoned scholars and researchers, examined issues such as curriculum reform, funding of education, inclusive education, teacher professional development, monitoring and evaluation, gender equity, science and technology education, and the integration of emerging technologies in teaching and learning. Through rigorous analyses and thoughtful discussions, the authors provide valuable insights into the achievements recorded in the education sector, the challenges that continue to impede effective policy implementation, and the prospects for future reforms.

Beyond its academic value, this book also serves a special purpose: it celebrates the life, scholarship, and contributions of **Professor Hauwa Imam**, a scholar whose work has had a profound influence on educational research, policy discourse, and professional practice in Nigeria. Professor Imam has distinguished herself over the years as a committed educator, a prolific scholar, and a mentor to many younger academics and students. Her contributions to areas such as early childhood education, educational policy, and teacher development have enriched the body of knowledge in education and have helped shape conversations on educational reform in Nigeria.

As a colleague who has had the privilege of interacting with Professor Imam within the academic community, I can attest to her intellectual depth, professional integrity, administrative prowess and the legacy of dedication to the advancement of education. She has consistently demonstrated excellence in scholarship, leadership in academic engagements, and generosity in mentoring emerging scholars. It is therefore most fitting

that this book is dedicated to celebrating her enduring contributions to the field of education.

The wide range of topics covered in the thirty-six chapters (split into two volumes) of this book reflects the complexity and dynamism of educational policy in Nigeria. Collectively, the contributions provide readers with a comprehensive understanding of the issues, debates, and emerging directions in the Nigerian education sector. The book will undoubtedly serve as a valuable reference for policymakers, researchers, teacher educators, administrators, and students who are interested in educational policy and reform.

I commend the editors and contributors for their dedication and scholarly effort in producing this important volume. Their work not only honours Professor Hauwa Imam but also contributes meaningfully to ongoing discussions on improving the quality, equity, and relevance of education in Nigeria.

I am confident that readers will find this book intellectually stimulating and highly useful in deepening their understanding of educational policies in Nigeria and the pathways toward a more effective and inclusive education system.

**Prof. Muhammad Ndagi,
Deputy Vice Chancellor (Administration),
University of Abuja.**

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PROFESSOR HAUWA IMAM'S PROFILE

Professor Hauwa Imam is a distinguished scholar of Educational Administration and a globally respected teacher educator whose career spans over four decades of impactful service in teaching, administration, research, institutional leadership, and education policy development. Renowned for her contributions to educational policy, school leadership effectiveness, educational governance and teacher education reform, she has earned national and international recognition as a transformative academic leader.

Throughout her career, Professor Imam has mentored generations of scholars at undergraduate, master's, and doctoral levels, shaping the next cadre of educational Administrators, Managers and Leaders across Nigeria and beyond. She has authored more than 80 peer-reviewed publications and has delivered keynote addresses at major academic conferences, where her work on instructional leadership, educational governance, digital pedagogy, and gender-responsive policy continues to influence scholarship and practice.

At the **University of Abuja**, she presently serves as pioneer Director Digital Pedagogy and Online Learning. In addition, she has held several strategic leadership roles, including Dean of the Faculty of Education and Director of the Centre for Gender Security and Youth Advancement. In these capacities, she advanced institutional reforms, strengthened teacher preparation systems, and championed youth and gender empowerment initiatives.

A pioneering institute builder, Professor Imam established the Institute of Education at the University of Abuja in 2004 as its founding Director. Under her leadership, the Institute grew to become Nigeria's largest teacher training institute. Upon her return as Director in 2022, up to January 2025, she repositioned the Institute through the introduction of a blended learning framework to align teacher education with contemporary digital demands.

Her commitment to innovation in digital pedagogy is further demonstrated by securing a grant from the **Commonwealth of Learning (CoL), Canada**, to develop the *Teaching Science with Technology Massive Open Online Course (TSTMOOC)*. Launched in March 2024, the course attracted participants from 53 countries, reflecting her global reach and leadership in open and distance learning. She has conducted several online capacity building programs with support from CoL and spearheaded the development of a regional online Postgraduate Diploma in Education (PGDE) to expand access to quality teacher preparation across Africa which is the inspiration for the establishment of the Institute of Digital Pedagogy and Online Learning of the University of Abuja.

Professor Imam has played a significant role in professional and policy networks. She served on Technical Advisory Group of the Nigerian Tertiary Education Trust Fund (TETFund) from 2020-2024, Her collaboration with the All-Nigerian Conference of Principals of Secondary Schools (ANCOPSS) contributed to improving school administration and teaching-learning practices nationwide. She served as President of the Nigerian Association for Educational Administration and Planning (NAEAP) from 2018 to 2022, where she strengthened research-policy linkages in educational planning and management.

An active member of the Nigerian Academy of Education (NAE) and Gender Equitable and Transformative Social Policy Africa (GETSPA), she has also maintained sustained engagement with the **Commonwealth Council for Educational Administration and Management (CCEAM)** since 2008. Representing East and West Africa (2018–2022), she was elected Vice President (2022–2024) and admitted as a Fellow of CCEAM in 2022. In recognition of her distinguished leadership and global contributions to educational administration, she was elected President of CCEAM on 26 August 2024 in Nicosia, Cyprus.

Professor Hauwa Imam's career reflects a rare blend of scholarly excellence, institutional entrepreneurship, digital innovation, and global educational leadership. Her work continues to shape policy discourse, strengthen leadership capacity, and advance equitable, technology-enabled education systems across Africa and the Commonwealth. She was appointed member of the National Council of the Association of Indian Principals (AIP) for the term 2025–27. She is a member Board of Trustees of Fountain University and Chairperson of the Board of Trustees of the University of Abuja Women Association among others.

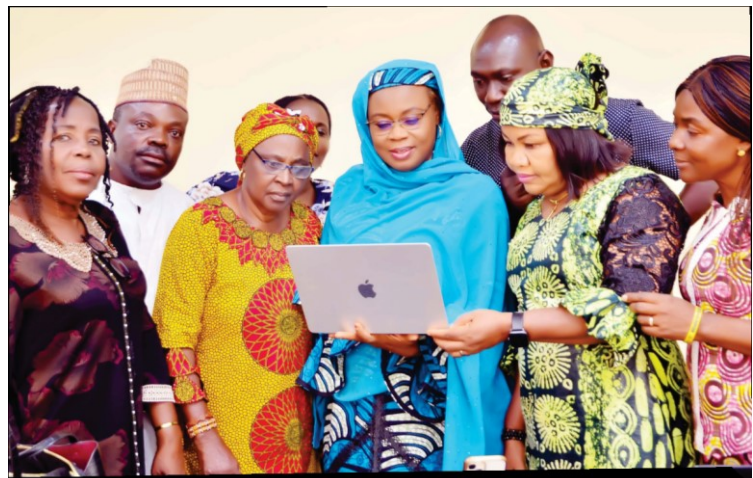
Pictorial Highlights of Prof. Hauwa Imam's Family and Academic Odyssey



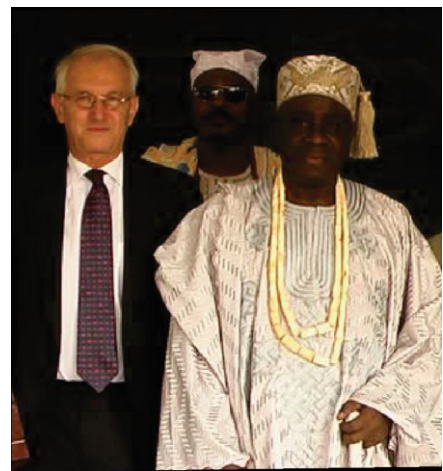
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CHAPTER ONE

CURRICULUM REFORM IN NIGERIA: DRIVERS, CHALLENGES AND PATHWAYS TO SUSTAINABLE AND INCLUSIVE EDUCATION

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Introduction

Curriculum reform in Nigeria is a fluid and continuous process shaped by philosophical values, socio-political contexts, economic imperatives, and technological progress. Reform efforts emerge both as responses to Nigeria's evolving educational and socio-economic landscape and as deliberate instruments for transforming it. Historically, the Nigerian educational system traces its origin to the British colonial model, which privileged rote learning and prepared students primarily for clerical roles rather than fostering critical thinking or technical skills. This colonial legacy embedded structural inequities and epistemological orientations that continued to shape educational policy well into the post-independence period. As Imam (2012) argues, colonial education in Nigeria was fundamentally instrumental, designed to serve administrative convenience rather than indigenous development priorities, a tendency that post-independence reforms have had to consciously confront. Following independence, initiatives such as the landmark 1969 National Curriculum Conference sought to recalibrate education to reflect national and cultural aspirations, incorporating science, technology, and vocational studies (Osokoya, 2019; Akinpelu, 1981).

A major impetus for curriculum reform remains the urgent need to address the persistent disconnect between schooling outcomes and employability demands. Scholars have repeatedly noted that an entrenched focus on certification rather than competence has left many graduates ill-prepared for contemporary workplaces, contributing to youth underemployment and reduced national productivity (Momodu & Ireyefoju, 2019). To prepare learners for a dynamic, technology-driven economy, Nigeria's curriculum must increasingly foster critical thinking, digital literacy, entrepreneurship, and applied skills.

Recent government initiatives reflect renewed ambition in this direction. The new basic education curriculum scheduled for implementation in January 2025 requires learners to graduate with at least two marketable skills, with explicit emphasis on entrepreneurship and vocational competence. Complementing this, an October 2024 report outlines the introduction of fifteen specialised skill-acquisition courses—ranging from plumbing and

baking to solar installation and robotics—targeted at primary through junior secondary levels. Nigeria’s broader digital transformation agenda is also illustrated by the 3 Million Technical Talent (3MTT) Programme launched in October 2023, which aims to build national capacity in high-demand digital domains such as artificial intelligence, cybersecurity, and data science by 2027.

The dynamics of curriculum reform in Nigeria are therefore shaped by interlocking forces: multi-sector collaboration among government bodies, educational institutions, private sector actors, and civil society; disparities in infrastructure and resources that risk uneven implementation between urban and rural areas; policy frameworks such as the Universal Basic Education programme and compulsory 12-year basic education model intended to standardise progression and reduce dropout; and political leadership and institutional capacity, which require sustained commitment from bodies such as NERDC, UBEC, and NCCE to ensure policy enactment and continuity. Against this backdrop, this chapter examines the key drivers of curriculum reform and the complex interplay of factors influencing implementation and effectiveness.

Philosophical and Ideological Drivers

Curriculum reform in Nigeria is fundamentally anchored in philosophical beliefs about the purposes of education and the kind of individual society intends to cultivate. These philosophical foundations shape what counts as worthwhile knowledge, the pedagogies prioritised, and the values and competencies transmitted to learners (Ornstein & Hunkins, 2018; Oriaifo, 2009). In Nigeria, reforms have traditionally been guided by pragmatism, emphasising knowledge with direct practical relevance to socio-economic development. This pragmatic orientation influenced the shift from a colonial, grammar-centred curriculum to one enriched with technical and vocational subjects, including Introductory Technology, Agricultural Science, and Business Studies. Such inclusions reflect national priorities geared toward skilled employment, entrepreneurship, and self-reliance within a developing economy (Okebukola, 2019; Federal Republic of Nigeria [FRN], 2014).

Beyond pragmatism, reconstructionism has also significantly shaped curriculum reform. Reconstructionism views education as a vehicle for societal transformation, advancing social change, national unity, and cultural regeneration (Counts, 1978). Post-independence curriculum reforms therefore aimed to decolonise education, nurture civic responsibility, and promote moral uprightness. The introduction of subjects such as Social Studies, Civic Education, and Nigerian History reflects these goals, with the intention of producing citizens committed to patriotism, democratic participation, and ethical conduct (Osokoya, 2019). The integration of moral and religious education further signals a broader societal aspiration to cultivate a value-driven citizenry.

Nigeria's curriculum thus reflects an eclectic philosophical orientation that blends pragmatism, reconstructionism, and essentialism in an attempt to balance academic, social, and cultural needs (Akinsola, 2021). This hybrid foundation represents an ongoing effort to reconcile multiple national objectives—economic productivity, cultural continuity, and socially responsible citizenship.

Ideologically, drivers of curriculum reform are rooted in Nigeria's evolving political, cultural, and social values. In the early post-independence era, reforms sought to assert cultural identity and decolonise educational content. This was institutionalised in the National Policy on Education, which aimed to make education distinctly Nigerian through the integration of indigenous languages, history, and cultural content (FRN, 2014). Such cultural nationalism sought to counter colonial alienation and strengthen pride in African heritage (Taiwo, 1980).

In more recent decades, globalisation has introduced new ideological imperatives. Nigeria's education system increasingly aligns with international standards that prioritise ICT, entrepreneurship, and STEM education. This orientation reflects an economic liberalism that positions education as a strategic means of preparing citizens for participation in the global knowledge economy (Obanya, 2021).

Nigeria's return to democratic governance in 1999 further infused curriculum reform with ideological commitments to democratic citizenship education. Civic Education was revitalised to promote human rights awareness, accountability, and active participation in governance, reflecting the belief that education should nurture informed citizens capable of sustaining democratic values (Olatunji, 2020). Consequently, Nigerian curriculum reforms reflect intersecting ideological currents—nationalism, globalisation, and democratisation—shaping educational aims in distinct but overlapping ways.

Political and Policy Influences

Political leadership and government policies play decisive roles in shaping curriculum reform in Nigeria. Historically, curriculum development has mirrored the priorities and ideologies of successive administrations. Political will and governance frameworks often determine the pace and direction of reforms, since curriculum change is rarely a neutral or purely technical undertaking (Obioma, 2005). For example, the Universal Primary Education (UPE) initiative introduced in 1976 sought to expand mass literacy and support national development, prompting extensive curricular revisions designed to promote access, equity, and functional education (Fafunwa, 1974). Similarly, the Universal Basic Education (UBE) programme launched in 1999 mandated free and compulsory schooling for children aged 6 to 15, necessitating curriculum adjustments that strengthened literacy, numeracy, citizenship education, and vocational skills.

Political ideologies have also shaped curriculum content and reform processes. The post-independence period emphasised nation-building and decolonisation through the integration of Nigerian History, Civic Education, and indigenous languages to promote national unity (Oriaifo, 2009). Military regimes, by contrast, tended to impose centralised, top-down reforms with minimal stakeholder participation (Taiwo, 1980). Since 1999, democratic governance has encouraged curriculum changes that advance democratic citizenship, human rights education, and global competitiveness (FRN, 2014).

Nonetheless, political instability and frequent changes of government have posed significant challenges, undermining continuity and coherence in reform implementation (Okebukola, 2004). Although the National Policy on Education provides a blueprint for educational goals and curriculum structure, periodic review is necessary to align education with evolving development strategies and international commitments (FRN, 2014). Global initiatives such as Education for All (EFA), the Millennium Development Goals (MDGs), and the Sustainable Development Goals (SDGs) have further pressured Nigeria to align curricula with international benchmarks, particularly in science, technology, and entrepreneurship education (UNESCO, 2021). However, policy reversals and weak implementation mechanisms frequently impede progress, creating persistent gaps between policy intentions and classroom realities (Osokoya, 2012). This underscores the need for curriculum reforms that are politically endorsed yet sufficiently insulated from administrative oscillations to ensure durability and meaningful impact.

Economic and Labour Market Demands

Economic imperatives and labour market expectations exert profound influence on curriculum reform in Nigeria. Education is widely viewed as a vehicle for producing a skilled workforce capable of propelling industrialisation, fostering entrepreneurship, and advancing national development (Okebukola, 2015; Fafunwa, 1974). Consequently, curriculum revisions are often designed to reflect evolving economic demands and to address the enduring mismatch between graduate competencies and labour market realities.

Nigeria's inherited colonial curriculum, oriented toward clerical and administrative roles in government service, became increasingly inadequate as post-independence Nigeria sought economic diversification (Taiwo, 1980). This shift informed the incorporation of technical, vocational, and entrepreneurial education through subjects such as Introductory Technology, Agricultural Science, and Business Studies within basic education (FRN, 2014).

The National Policy on Education has consistently emphasised functional education intended to equip learners with self-reliance, innovation, and job-creation capabilities

(FRN, 2014). The 6-3-3-4 system similarly prioritised entrepreneurship to prepare graduates for employment and self-employment, responding to persistent youth unemployment and underemployment (Yalams, 2017). These reforms align with global trends that require education systems to adapt to knowledge economies and pressures of globalisation (UNESCO, 2021). As a result, entrepreneurship education and vocational training have gained prominence.

At the tertiary level, reforms have targeted strengthened STEM disciplines and deeper ICT integration to prepare graduates for participation in the digital economy (Okebukola, 2020). Nevertheless, a substantial skills gap remains; employers frequently report deficits in graduates' problem-solving, communication, and entrepreneurial abilities (World Bank, 2020). This persistence highlights the need for reforms that are not only policy-driven but firmly anchored in labour market evidence. Ultimately, economic and labour market needs remain central to Nigeria's curriculum reform agenda, requiring curricula to evolve with global shifts such as digital economies and remote work in order to produce an adaptable, innovative, and globally competitive workforce.

Social and Cultural Dynamics

Social and cultural factors play pivotal roles in shaping curriculum reform and educational development in Nigeria. Education is not merely a medium for knowledge transmission; it also communicates values, norms, and cultural identities (Fafunwa, 1974; Adeyemi & Adeyinka, 2003). Nigeria's multi-ethnic diversity demands curricula that reflect and respect plural identities while simultaneously strengthening national unity and social cohesion.

Historically, colonial education privileged European history, literature, and values, marginalising indigenous languages and knowledge systems (Taiwo, 1980). Post-independence reforms sought to restore cultural pride by integrating Nigerian languages, history, and cultural studies into the curriculum, strengthening learners' identity and sense of belonging (FRN, 2014). Religious and moral education remains prominent, reflecting societal concerns about discipline, ethics, and character formation (Obioma, 2006). Both Christian and Islamic communities have influenced this component, aiming to cultivate moral development and spiritual values among learners.

Equity and inclusion constitute a major social dimension of curriculum reform. Efforts to expand access for girls, marginalised groups, rural populations, and persons with disabilities are embedded in policies such as the Universal Basic Education initiative (Adewumi, 2018; UNESCO, 2021). Curriculum reforms have also sought to reduce barriers to girls' participation in STEM subjects, reflecting broader shifts toward gender equality and social justice.

Globalisation introduces both opportunities and tensions. While ICT integration supports digital literacy and global connectivity, reforms also emphasise preserving indigenous cultural practices. This produces a hybrid framework that balances local relevance with global competitiveness (Okebukola, 2020). In addition, youth empowerment programmes addressing social challenges such as substance abuse and cultism increasingly feature in school programmes, reflecting education's central role in social transformation. Nigeria's diverse social context therefore requires curriculum reforms that are culturally sensitive and inclusivity-driven, equipping learners to contribute meaningfully to their communities and the wider world (Ohadiugha, 2025).

Technological Advancements

Technological innovation is a significant driver of curriculum reform globally, and Nigeria is no exception. Growing integration of digital tools, information systems, and ICT infrastructure has transformed curriculum content and delivery at all levels. Nigeria has recognised technology's importance through policies such as the National Policy on ICT in Education, introduced in 2001 and revised in 2019, which emphasises digital literacy, e-learning platforms, and computer-assisted instruction (FRN, 2019).

Accordingly, curriculum reforms increasingly embed ICT competencies across schooling stages to ensure learners acquire skills essential for the 21st-century economy (Adebayo & Abdulhamid, 2021). Technology is also framed as a means of addressing inequities; e-learning and mobile learning can extend access to rural and marginalised populations where physical infrastructure is limited (Able-God-Esene & Ireyefoju, 2024). The COVID-19 pandemic further exposed the urgency of curricula that support remote and blended learning, while also highlighting persistent regional digital divides (Onyema et al., 2020).

Beyond access, technology integration requires pedagogical shifts. Digital tools—interactive software, simulations, and multimedia resources—support learner-centred, inquiry-driven, and play-based learning, especially in early childhood education (Ibidapo-Obe, 2007). These shifts necessitate curricular adjustments that strengthen creativity, critical thinking, and problem-solving—competencies central to a technology-driven global market.

Looking ahead, Nigeria's curriculum reforms increasingly reflect Fourth Industrial Revolution demands, including artificial intelligence, robotics, and big data (World Economic Forum, 2020). Aligning curricula with these emerging skills strengthens global competitiveness and supports SDG 4 on quality education (UNESCO, 2015).

International Influence and Globalisation

Globalisation and international policy trends have strongly influenced Nigeria's curriculum reforms, pushing the system toward global standards in quality, equity, and competitiveness. Nigeria's commitments to Education for All, the MDGs, and the SDGs reflect an intent to provide inclusive, equitable, and lifelong learning while reducing disparities (UNESCO, 2015).

Global trends encouraging curricular harmonisation are evident in Nigeria's increased emphasis on literacy, numeracy, STEM education, and 21st-century skills (Obanya, 2010). Nigeria's membership in continental frameworks, including the African Union, and alignment with initiatives such as the Continental Education Strategy for Africa (CESA 16–25) also shape priorities and reinforce shared educational goals (African Union, 2016).

The curriculum further incorporates global citizenship education, intercultural understanding, and peace education to prepare learners for participation in a global society, while still preserving national identity and indigenous knowledge (Tikly, 2001). This dual commitment creates a delicate balancing act between international influence and local relevance, underscoring the importance of context-sensitive reforms.

International organisations, donor agencies, and NGOs have played influential roles by providing funding, technical assistance, and policy models. Agencies such as the World Bank, UNICEF, and UNESCO have supported initiatives in early childhood education, teacher development, and literacy enhancement, shaping policy and curriculum decisions (Oketch et al., 2020). However, concerns remain that external agendas may weaken locally grounded educational practices. Nigeria's curriculum reform efforts therefore continue to seek alignment between global aspirations and socio-cultural realities to maximise relevance and impact.

Institutional and Structural Dynamics

Institutional and structural factors strongly influence the trajectory, implementation, and sustainability of curriculum reform in Nigeria. Governance arrangements, institutional capacity, and system-wide coordination constitute both opportunities and constraints. Institutions such as the Federal Ministry of Education and NERDC lead curriculum development and review. Yet overlapping responsibilities across federal, state, and local levels—combined with weak coordination and bureaucratic delays—often impede coherent implementation (FRN, 2025; Olawale, 2014). Nigeria's federal structure complicates uniform adoption, enabling wealthier states to implement reforms more effectively than resource-constrained states, thereby reinforcing regional disparities in education quality and access (Fafunwa, 2004).

Institutional capacity within schools and teacher education institutions is also critical. Limited funding, inadequate teacher preparation, and weak infrastructure constrain the delivery of new curriculum content (Odukoya & Adepoju, 2020). Teacher education programmes often struggle to integrate innovations, particularly learner-centred pedagogies and technology-enhanced instruction. Although agencies such as the NUC and UBEC hold oversight roles, accountability and monitoring remain weak, resulting in limited evaluation of curriculum relevance and effectiveness (World Bank, 2021).

Resistance to change is another recurring challenge. Educators and administrators accustomed to traditional methods may resist reforms that demand new pedagogies or increased workloads. Consequently, sustained stakeholder engagement and consultation are essential for building ownership and ensuring smoother implementation (Fullan, 2007).

Challenges and Constraints

Despite robust and multi-layered reform drivers, significant constraints continue to undermine effective curriculum implementation in Nigeria. A major obstacle is chronic underfunding. Although UNESCO recommends allocating 15–20% of national budgets to education, Nigeria's allocations remain lower, limiting investment in teacher training, learning materials, and infrastructure (UNESCO, 2021). Teachers—central to curriculum delivery—often lack adequate preparation for learner-centred and innovative pedagogies. The disjunction between curriculum design and classroom practice frequently results in continued reliance on rote teaching methods, undermining intended pedagogical transformation (Akinrotimi & Olowe, 2019).

Governance fragmentation and poor coordination among agencies such as the Federal Ministry of Education, NERDC, and state ministries further weaken implementation. Overlapping roles often produce duplication, delays, and inefficiency (Olawale, 2014). Resistance from educators, administrators, and parents accustomed to conventional instructional practices also slows adoption of reforms, particularly those requiring inquiry-based or learner-centred approaches.

Socio-economic and regional inequalities contribute to uneven reform uptake. Rural and many northern areas often face shortages of infrastructure, qualified teachers, and learning resources, making equitable implementation difficult (World Bank, 2021). The digital divide is especially pronounced: many schools lack electricity, internet connectivity, and ICT resources required for digital literacy components (World Economic Forum, 2020).

Frequent political transitions and policy discontinuities further disrupt reform trajectories. New administrations often introduce initiatives without consolidating

earlier efforts, undermining long-term consistency (Okebukola, 2015). In addition, Nigeria's assessment systems largely reward memorisation and examination performance rather than critical thinking and skills acquisition, discouraging innovative teaching and weakening alignment between curriculum goals and learning outcomes (Obanya, 2014).

Addressing these challenges requires sustained political will, improved funding, strengthened teacher professional development, coordinated governance, infrastructure investment, and systemic assessment reform. Without these supports, curriculum reforms may remain policy ideals rather than classroom realities.

Conclusion

Curriculum reform in Nigeria is a complex and ongoing process shaped by philosophical, ideological, political, economic, social, cultural, technological, international, and institutional factors. Achieving effective reform requires balancing global best practices with local realities in ways that promote relevance, equity, and quality. Although strong drivers exist—labour market demands, inclusion priorities, digital transformation, and international commitments—significant barriers persist, including underfunding, limited institutional capacity, weak teacher preparedness, socio-economic disparities, resistance to pedagogical innovation, technology gaps, and policy discontinuities. Moving forward, Nigeria requires a holistic and sustained approach that strengthens institutional frameworks, prioritises inclusive and learner-centred pedagogy, improves coordination, and ensures continuity of implementation. Such an approach will better equip learners with the knowledge, skills, and values necessary for national development and meaningful participation in a globalised world.

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CHAPTER TWO

FUNDING OF SECONDARY EDUCATION IN NIGERIA: EXPLORING CONTEMPORARY ALTERNATIVES FOR SUSTAINABLE GOAL

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Introduction

Education remains one of the most powerful instruments for national transformation, economic competitiveness, and social cohesion. Within the Nigerian education system, secondary education occupies a strategic middle position, linking foundational basic education with tertiary specialization and workforce integration. It is at this level that learners consolidate cognitive skills, acquire vocational competencies, and develop civic values necessary for productive citizenship. As Adesina and Okoro (2024) observe, secondary education plays a decisive role in the production of middle-level human capital required for industrial growth, technological innovation, and public sector efficiency.

Beyond its national significance, secondary education contributes directly to the realization of global development frameworks such as Sustainable Development Goal 4 (SDG 4), which seeks to ensure inclusive and equitable quality education for all. Nigeria's Medium-Term National Development Plan (2021–2025) similarly emphasizes human capital development as the foundation for economic diversification and sustainable growth.

However, the attainment of these ambitious objectives remains severely constrained by chronic financing challenges. For decades, Nigeria has struggled to meet international spending benchmarks for education, often allocating far below recommended thresholds (Ebi & Ubi, 2017; Okorie et al., 2025). Even when budgetary provisions increase nominally, actual disbursements frequently fall short due to fiscal instability, revenue volatility, and competing national priorities. The implication is a persistent shortage of infrastructure, instructional materials, qualified teachers, and technological resources across secondary schools.

The historical roots of this financing fragility are well documented. Imam (2012) argues that Nigeria's educational policy trajectory—from colonial regional disparities to post-independence fiscal federalism—has entrenched structural imbalances that continue to influence funding patterns. Thus, contemporary funding deficits are not merely technical inefficiencies; they reflect deeper institutional and political economy constraints embedded within governance structures.

Given Nigeria's growing youth population, rising enrolment pressures, and expanding technological demands, reliance on traditional government subvention alone is increasingly unsustainable. Sustainable goal attainment in secondary education therefore requires a paradigm shift toward diversified, predictable, and equity-driven financing mechanisms.

Conceptualizing the Funding of Secondary Education

The concept of funding education extends beyond annual budgetary allocation. It encompasses the mobilization, allocation, management, and accountability of financial resources to sustain institutional performance over time. Education financing is rooted in the recognition of education as a public good and a long-term investment in human capital, social stability, and economic competitiveness.

Historically, Nigeria's financing model has been centralized and revenue-dependent, heavily tied to oil earnings. While this model enabled rapid expansion during periods of economic prosperity, it has proven vulnerable to global commodity shocks and domestic fiscal instability. The consequence has been erratic funding cycles that undermine strategic planning.

Contemporary scholarship emphasizes that sustainable education financing must demonstrate five characteristics:

1. **Predictability** – stable, legislated revenue streams insulated from political cycles.
2. **Equity** – allocation formulas that prioritize historically disadvantaged regions.
3. **Transparency** – robust accountability systems to prevent leakage.
4. **Diversification** – multiple funding channels beyond government budgets.
5. **Sustainability** – long-term investment planning rather than short-term expenditure.

Imam (2012) underscores the importance of policy coherence and institutional continuity in educational development. Without structural alignment between financing mechanisms and governance architecture, reforms risk fragmentation and limited impact.

Existing Gaps in the Government-Dependent Funding Model

Chronic Funding Shortfalls: Nigeria's inability to consistently meet international education financing benchmarks reflects both fiscal constraints and political prioritization challenges. Okorie et al. (2025) describe the "26% mirage" as symptomatic of a broader structural reluctance to treat education as a top-tier national investment. Secondary schools therefore operate within constrained fiscal environments that limit infrastructural expansion, laboratory development, and teacher recruitment.

Funding Instability: Budgetary volatility remains a defining feature of Nigeria's education financing landscape. Fluctuating oil revenues, currency depreciation, and inflation reduce the real value of allocations. Even when budgets are approved, delayed releases disrupt project timelines and weaken institutional planning capacity (Gwarzo, 2021). This instability discourages long-term investments such as curriculum reform, teacher professional development, and technology integration.

Revenue Unpredictability: Nigeria's fiscal architecture remains heavily dependent on oil revenue. Global economic disruptions, geopolitical tensions, and shifts in energy markets introduce uncertainty into national revenue streams. Education financing, tied to these revenues, becomes vulnerable to macroeconomic shocks.

Funding Inequity: Funding inequity persists across geopolitical zones and between urban and rural schools. Nnamdi and Eze (2024) note that resource distribution frequently reflects political visibility rather than educational need. Historically marginalized regions therefore remain underfunded, perpetuating intergenerational disadvantage—a pattern Imam (2012) links to colonial administrative imbalances.

Implications for Educational Quality and National Development

The consequences of inadequate financing extend beyond infrastructure. They affect:

- Teacher quality and motivation
- Student retention and completion rates
- Science and technology capacity
- Youth employability
- National productivity

Human Capital Theory posits that sustained educational investment enhances long-term economic growth. Conversely, underinvestment perpetuates poverty, unemployment, and social instability. Nigeria's demographic expansion amplifies urgency; secondary schools must accommodate rising cohorts with insufficient financial growth.

Contemporary Funding Alternatives for Sustainable Secondary Education

Dedicated National Education Tax and Trust Fund: One promising alternative is the establishment of a Secondary Education Trust Fund modeled after TETFund (Tijani, 2023). A legislated corporate levy dedicated to secondary education would provide predictable funding insulated from annual budget cycles.

Key benefits include:

- Multi-year infrastructure planning
- Guaranteed teacher development grants
- Technology modernization funding
- Equity-based redistributive allocation

By institutionalizing funding beyond political discretion, such a model aligns with Imam's (2012) call for structural reform in policy continuity.

Structured Public–Private Partnerships (PPPs): Secondary education—especially technical and vocational streams—requires capital-intensive facilities. Ogunlana and Adekunle (2022) argue that structured PPPs can enhance efficiency, curriculum relevance, and industry alignment.

Unlike ad hoc corporate donations, formal PPP frameworks ensure:

- Maintenance agreements
- Curriculum-industry alignment
- Long-term investment commitments
- Shared accountability

Legislative backing is essential to prevent concentration of investments in already advantaged urban schools.

Decentralized School-Level Resource Mobilization: Community endowments, alumni networks, and local investment initiatives represent complementary funding streams (Bello, 2021). Decentralization enhances responsiveness and local accountability. However, to avoid deepening inequality, state-level matching grants must amplify contributions from resource-poor communities.

Implementation Strategies for Sustainable Reform

Transparency and Digital Accountability: New funding mechanisms must integrate real-time digital financial tracking systems (Nwosu & Idowu, 2024). Public dashboards tracking levy collection and expenditure increase transparency and build stakeholder confidence.

Securing Political Will: Funding reform requires bipartisan legislative commitment. As Abubakar (2023) argues, educational financing must be framed as a national survival imperative rather than discretionary spending.

Equity-Driven Allocation Mechanisms: Redistributive formulas must direct higher per-capita funding to disadvantaged schools (Okafor & Musa, 2025). Without legislated equity safeguards, innovative funding may reinforce disparities.

Conclusion

Nigeria's secondary education financing system requires structural transformation. Persistent reliance on unstable government subvention undermines long-term planning and equitable development. A diversified funding ecosystem—anchored in trust funds, structured PPPs, decentralized mobilization, digital transparency, and redistributive equity—offers a viable pathway toward sustainable goal attainment. In line with Imam's (2012) scholarship, sustainable reform must be historically informed, institutionally coherent, and politically sustained. Secondary education financing is not merely a fiscal exercise; it is a strategic investment in Nigeria's economic future, democratic stability, and global competitiveness.

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CHAPTER THREE

GLOBALIZATION AND EDUCATION IN NIGERIA

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Introduction

Globalization in the 21st century has become a prominent and widely recognized concept. Although the term 'globalization' was not coined until the latter part of the 20th century, its origins can be traced back to the period between 1450 and 1500 A.D., known as the mercantilist era, characterized by the expansion of trade aimed at establishing commercial empires to broaden their markets (Ogohi: 2014). Globalization encompasses a range of changes that affect social, economic, technological, and cultural aspects. Its interpretation may vary depending on the viewpoint from which it is analyzed (Stromquist and Monkman, 2014). Winkler and Yeo (2007) described globalization as a term that reflects the changing geo-political environment. They observed that it signifies a combination of multinational and domestic frameworks, enabling the economy, politics, culture, and perspectives of one nation to permeate another. As a member of the global community, Nigeria is not exempt from the impacts of globalization. Globalization is characterized by the increasing interdependence of nations through economic, social, and technological exchanges, which profoundly affects educational systems worldwide, including in Nigeria. It has resulted in significant transformations across various aspects of human activity, leading to alterations in individuals' subjective perceptions of their environment and their roles within it (Webb et. al., 2006; Akomolafe, 2022; Wubante et al., 2022).

Education is a crucial component of the information economy and plays an essential role in the global transition. According to Aliyu in Ossai & Nwalado (2013), globalization affects many facets of human life, including education. In this century, globalization significantly influences education around the world, generating a wealth of educational opportunities. The effects of globalization on Nigeria's educational system are complex, presenting both considerable opportunities and notable challenges. Traditionally, Nigeria's educational policies have been shaped by global trends, a legacy of its colonial history. Nevertheless, the rise of digital technologies and enhanced global connectivity has prompted a need to reassess and modify its educational framework to effectively

compete on the international stage. It is against this backdrop that this chapter explores the multifaceted effects of globalization on Nigeria's educational system.

Objectives of the Chapter

After reading this chapter, the reader should be able to:

1. Define education
2. Identify the aims and objectives of education in Nigeria are;
3. Describe the three Forms of Education in Nigeria
4. Itemise the levels of Education in Nigeria
5. Define Globalization
6. Explain the impact Impacts of Globalization on Nigerian Education
7. State the Problems militating against the globalization of education in Nigeria
8. Proffer solutions to the Problems militating against the globalization of education in Nigeria

Conceptual Clarification

Education: Education has its roots in the Latin word "educare," which means to nurture or raise. Numerous scholars have expressed the idea of education in various manners. In general terms, education serves as the means by which societal values, norms, and preferred attitudes are transmitted from one generation to another. It involves the sharing and gaining of knowledge through teaching and learning processes (Encarta, 2009). Vikoo (2016) aptly describes education as a dynamic interaction between a teacher and a student, where the teacher is tasked with facilitating the expected change in the student's behavior. Ocho (2005) perceives education as the pathway through which individuals become active participants in their society. Okoorosaye-Orubite (2019) characterizes education as a social construct, designed to meet the specific needs of society at any given moment. The structure, content, methods, and target audience of education are shaped by societal demands.

Idowu (2011) defines education as a holistic process of human learning that involves the transmission of knowledge, the training of faculties, and the development of skills. In 2015, UNESCO framed education as a form of learning that is intentional, purposeful, and organized. It also recognizes education as the process of fostering attitudes and gaining experiences that empower individuals to lead fulfilling lives. Thus, education includes mental training, a journey of learning, and the acquisition of knowledge and skills, along with the enhancement of habits, behaviors, judgments, belief systems, and values. In a broader context, education can be seen as the totality of experiences that an individual gathers from birth to death, extending beyond the traditional classroom setting.

Education is considered the cornerstone for the advancement of any nation. It is perceived as a crucial factor for significant and sustainable development, as well as for achievements in the realms of art, science, and technology. Supporting this viewpoint, Umo (2005) stated that education is universally recognized as a driving force for attaining socio-economic, scientific, and technological advancement. Education acts as a vehicle for the comprehensive development of individuals across social, mental, physical, emotional, moral, and psychological aspects. It can be understood as a process that enables individuals to differentiate between positive and negative attitudes, as well as right and wrong actions. Education can be characterized as a set of tools and methods used to gain empirical knowledge about the important facets of life and how to effectively apply them. The goals and objectives of education in Nigeria are;

- ❖ The inculcation of national consciousness and national unity.
- ❖ The inculcation of the right type of values and attitudes for the survival of the individual and the society.
- ❖ the training of the mind in the understanding of the world around and
- ❖ The acquisition of appropriate skills, abilities and competences both mental and physical as equipment for the individual to live in and contribute to the development of his society. (FGN 2013)

Forms of Education in Nigeria

There are basically three forms of education in Nigeria namely:

Formal Education System: Coombs and Ahmed provide a widely cited definition of formal education, characterizing it as "the institutionalized, chronologically graded and hierarchically structured... system, spanning lower primary school and the upper reaches of the university" (Coombs & Ahmed, 1974). Formal education is primarily focused on the teacher (Dovey & Fisher, 2014), directed by sequentially organized learning objectives (Council of Europe, 2022), and structured within a chronologically graded framework (Garner et al., 2015). In Nigeria, the formal education system encompasses organized learning environments managed by governmental bodies such as the Ministry of Education and relevant agencies at both federal and state levels. It is divided into four tiers: Pre-primary, Primary Education, Secondary Education and tertiary Education.

Informal Education System: Informal learning is often described as a residual category of non-formal learning, which itself is a residual category of formal learning (Schugurensky, 2000). This classification can create difficulties, as defining a concept by what it is not does little to illuminate its intrinsic characteristics (Bourke et al., 2018). The definition of informal learning can also be a point of contention, as some people have used the terms informal and non-formal interchangeably (Colley et al., 2003).

Informal learning consists of several elements. It may emerge as a byproduct of other experiences (Allaste et al., 2021; Cain & Chapman, 2014). It includes tacit knowledge that is not actively pursued and may go unnoticed by the learner; for example, "informal learning is largely invisible, because much of it is either taken for granted or not recognized as learning; thus, respondents lack awareness of their own learning" (Eraut, 2004). Furthermore, learners may become aware of unexpected informal learning, which is known as incidental learning (Schugurensky, 2000). The informal education system in Nigeria operates outside the formal schooling structure and includes various non-formal learning opportunities that are woven into everyday life. It encompasses: Traditional apprenticeship system, Community-based learning initiatives, Religious education and Vocational training program.

Non-Formal Education: Coombs and Ahmed provide a frequently cited definition of non-formal education. They characterize it as "any organized, systematic, educational activity carried out outside the framework of the formal system to impart specific types of learning to designated subgroups within the population, which includes both adults and children" (Coombs & Ahmed, 1974, p. 8). Like many definitions of non-formal education, it appears to be "a 'negative' concept in that it negates something else. It offers minimal positive insight into content, profile, or quality" (Bjørnåvold, 2000, p. 22). Non-formal education includes various elements. It is systematically planned (to some extent) (Allaste et al., 2021; Mok, 2011) and is structured around specific learning goals (Garner et al., 2015). It takes place outside of compulsory educational provisions (Filippoupoliti & Koliopoulos, 2014), but can occur in a variety of settings e.g.: Basic Literacy Programs, Community-Based Non-Formal Learning Centers, Adult Literacy Programs, Skill Acquisition Programs, Education for Special Groups, Qur'anic Schools with and Integrated Basic Education and Informal HIV/AIDS Education (Mok, 2011).

Levels of Education in Nigeria

The Nigerian educational system comprises of four levels of organization. They include:

1. **Pre-primary Education:** - Pre-primary Education is regarded as early childhood care and development education. This educational level serves children up to the age of 5 years. These institutions were established under degree No.16 of 1985 (National minimum standards and establishment of institutions). They function as day care centers and nursery/kindergarten schools operated by private entities and individuals. The main objectives are to nurture and instil appropriate educational attitudes and awareness in young children.
2. **Primary Education:** Primary Education signifies the first stage of the formal education system. It provides a six-year program for children aged 6 to 12 years (Federal Government of Nigeria, 2013). The goals of Primary Education include equipping pupils for a well-rounded education with an emphasis on achieving enduring and practical

literacy, numeracy, and effective communication skills. The primary school curriculum typically includes subjects such as: **Primary 1–3:** English Studies, Mathematics, Nigerian Languages (one Nigerian language), Basic Science, Physical & Health Education, Christian Religious Studies (for Christian pupils only) / Islamic Studies (for Muslim pupils only), Nigerian History, Social and Citizenship Studies, Cultural & Creative Arts (CCA), Arabic Language (Optional) (Minimum of 9 and maximum of 10 subjects) and **Primary 4–6:** English Studies, Mathematics, Nigerian Languages (one Nigerian language), Basic Science and Technology, Physical & Health Education, Basic Digital Literacy, Christian Religious Studies (for Christian pupils only) / Islamic Studies (for Muslim pupils only), Nigerian History, Social and Citizenship Studies, Cultural & Creative Arts (CCA), Pre-vocational Studies, French (Optional), Arabic Language (Optional) (Minimum of 11 and maximum of 13 subjects)

3. **Secondary Education:** This type of education is provided to children following their completion of primary school. Secondary education consists of two stages, spanning a total duration of six years.

- a) The first phase includes classes from J.S.S 1 to J.S.S 3. After finishing J.S.S 3, students are required to take and pass the junior secondary school certificate examination (JSSCE). Most students are aged between 12 and 15 years. Junior secondary school is categorized into two streams: pre-vocational and academic. The essential curriculum consists of English Studies, Mathematics, Nigerian Languages (one Nigerian language), Intermediate Science, Physical & Health Education, Digital Technologies, Christian Religious Studies (for Christian pupils only) / Islamic Studies (for Muslim pupils only), Nigerian History, Social and Citizenship Studies, Cultural & Creative Arts (CCA), Trade Subjects (students to choose one from: Solar Photovoltaic Installation and Maintenance, Fashion Design and Garment Making, Livestock Farming, Beauty and Cosmetology, Computer Hardware and GSM Repairs, Horticulture and Crop Production), Business Studies, French (Optional) and Arabic Language (Optional) (Minimum of 12 subjects; maximum of 14 subjects) (NERDC, 2025).
- b) The next phase comprises classes from SS1 to SS3 at the senior secondary education level. During this stage, the abilities, attitudes, and interests of the students are considered when choosing subjects. Evaluation and certification rely on continuous assessments and external examinations such as WASC and NECO. Students are usually aged between 15 and 18 years. The senior secondary cycle lasts three years, during which each student selects eight subjects from a diverse curriculum. Five subjects are compulsory: **Core and Compulsory Subjects:** English Language, General Mathematics, One Trade Subject, Citizenship and Heritage Studies, Digital Technologies. **Science Subjects:** Biology, Chemistry, Physics, Agriculture, Further Mathematics, Physical Education, Health Education, Foods & Nutrition, Geography, Technical

Drawing. **Humanities:** Nigerian History, Government, Christian Religious Studies, Islamic Studies, One Nigerian Language, French, Arabic, Visual Arts, Music, Literature in English, Home Management, Catering Craft. **Business Subjects:** Accounting, Commerce, Marketing, Economics. **One Core Trade Subject (student is to choose one):** Solar Photovoltaic Installation and Maintenance, Fashion Design and Garment Making, Livestock Farming, Beauty and Cosmetology, Computer Hardware and GSM Repairs and Horticulture and Crop Production (NERDC, 2025).

4. **Tertiary or Higher Education:** This level of education is offered to students who successfully progress to universities, colleges of education, polytechnics, and other related institutions. As noted by Gbamanja (1997), the goals of higher education encompass the improvement of intellectual abilities to understand and adapt to the environment, along with the development of pertinent skills.

- a) **University Education:** The university stands as the apex of tertiary education in Nigeria. There are three types of universities: federal, state and Private. Admission is open to all students who successfully complete the Joint Admission and Matriculation Board Examination requirement which is a minimum of five (5) credit passes in O-level examinations. The typical age according to Federal Government of Nigeria is 16 years for admission into tertiary institutions, effective from the 2025/2026 academic session. Universities award first degrees, master's degrees, and Ph.D. degrees in various fields, in addition to diplomas in education and other professional programmes.
- b) **Colleges of Education:** These institutions play a crucial role in teacher training and are associated with universities. They provide a three-year program that leads to the Nigerian Certificate in Education. Some of these colleges also confer degrees.
- c) **Polytechnic Education:** Polytechnics concentrate on delivering middle-level manpower and vocational skills across different specializations. Polytechnic programs are organized into two phases, each lasting two years, culminating in the granting of a National Diploma (ND) and a Higher National Diploma (HND) after an additional two years.
- d) Furthermore, there are inter-university centers, monotechnic, and specialized institutions such as schools of health technology, colleges of agriculture, and the National Teachers Institutions (NTI), among others. The discussion above underscores the importance of education at all levels for the nation. Therefore, its objectives should be strictly followed.

Concept of Globalization

Globalization has been recognized as a significant concept since the early 21st century. However, defining it in concrete terms can be challenging due to its abstract nature. It

embodies a new and complex phenomenon that remains somewhat unclear. As a result, globalization can mean different things to different people. In essence, globalization involves the movement of people, languages, capital, goods, services, ideas, and more across the world. The term 'global' refers to or encompasses the whole world. Additionally, globalization has been a part of human history and migration. What is new is its acceleration, fueled by technological progress, the spread of information, market liberalization, and improvements in communication, transportation, and migration (Stromquist, 2002; Davis and Egbuchu, 2019).

Ogakwu and Isife (2013) describe globalization as the process of interaction and integration among individuals, businesses, and governments from different countries—a process driven by international trade and investment, and supported by information technology. Globalization is one aspect of the larger forces of modernization, which portray societies as increasingly defined by the complexity of communication (Charlton and Andras, 2003). Oyindo (2013) describes globalization as the rise of new networks of production, finance, and information that have improved the international movement of goods, service delivery, and capital. Similarly, Wangari et al. (2005) define globalization as a complex phenomenon that encourages new forms of social relations while maintaining traditional modes of capitalist expansion.

Impacts of Globalization on Nigerian Education

Globalization acts as a transformative force that greatly affects various facets of life, such as social, political, economic, religious, and educational areas. The consequences of globalization are characterized by the increasing integration of national economies into a larger market for goods and services (Stromquist, 2002; Wangari et al, 2005; Oyindo, 2013; Pacho, 2020).

To a significant extent, globalization has produced both beneficial and detrimental effects on education in Nigeria. It is important to acknowledge that the effects of globalization are not optional for developing countries, including Nigeria, but are rather compelling and necessary (Bright & Odunayo, 2015). With the growth of awareness and technological advancements, globalization has broadened educational opportunities worldwide. A rising number of children are enrolling in school and obtaining formal education (Sulaiman, 2015; UNESCO, 2015; Bissoonauth, 2019; UNICEF, 2000).

The advent of global technology and communication systems has transformed education into a lifelong learning journey that fosters transferable skills and knowledge relevant in competitive markets (Meyer et al, 2011). Bourdieu (2006) argued that while the direct impact of globalization on school curriculum pedagogy is limited, there is little evidence to indicate that this assessment has shifted over the last decade. For example, despite initiatives in numerous countries to integrate greater global awareness into school curricula, these efforts have generally remained low-priority additions (Rambla, 2006).

A significant concern is the effect of processes associated with global integration, which is now profoundly influencing teaching methods. However, Cullingford and Gunn (2005) asserted that although the direct effects of globalization on curriculum and pedagogy have been restricted, the wider impacts of economic restructuring and related economic and political ideologies have been considerable.

The widespread availability of computers and internet connections, despite existing inequalities, has granted access to a wealth of information and educational resources. Students and educators in Nigeria can now utilize international curricula, e-books, journals, and online courses, effectively overcoming geographical barriers. This easy access to academic publications and cutting-edge educational advancements is transforming the speed and methodology of learning.

Globalization has improved Access to Quality Education: With the rise of globalization, international curricula, research, and numerous resources have become available at Indian institutions. Students can now receive quality education without the necessity of traveling abroad. **Globalization has encouraged International Collaborations:** Indian universities have increasingly formed international partnerships for student exchanges and research projects. This has enhanced the experience, diversity, and quality of education for students.

Globalization has broadened Online Education: Thanks to e-learning platforms, students in India can engage in classes provided by some of the world's top universities, often without worries about location or expense. **Globalization creates Job Opportunities Abroad:** By earning international degrees, students are equipped to acquire international experience, which has also played a role in strengthening the workforce in Nigeria across various industries.

Challenges of Globalization on Nigerian Education

According to Velocity Global (2023), the challenges hindering the globalization of education in Nigeria are as follows:

1. **Insufficient Computers in Nigerian Educational Institutions:** Most schools lack adequate computers for student use. Even when computers are available, they are often not enough. This issue has greatly hindered progress within our educational system.
2. **Electricity Challenges:** The lack of reliable electricity severely restricts the use of ICT in education, especially in developing countries like Nigeria.
3. **Insufficient Financial Resources:** Without adequate funding, it becomes difficult to provide computers and other ICT resources that could enhance the learning experience.

4. **Shortage of Personnel for ICT Maintenance:** Nigeria faces a shortage of qualified individuals to maintain or repair ICT equipment. As a result, when devices break down, they often remain out of service for long periods while waiting for repairs. Mkpaa (2007) pointed out that there is a significant lack of personnel needed to support the system.
5. **Deficiency in Expert Knowledge Regarding ICT Usage:** There is a clear lack of expert knowledge in ICT among teachers, as many educators in Nigerian schools are not computer literate. If it is true that no educational system can surpass the quality of its teachers, then it is crucial for the current generation of teachers at all educational levels to receive retraining in ICT, considering that most did not have such training upon graduation. Currently, the majority of teachers, who lack computer skills, are unable to properly prepare students for the modern information and technology-driven world (Oleforo, 2013).

Conclusion and Recommendations

The impact of globalization on education in Nigeria presents a multifaceted challenge, providing both significant opportunities and notable obstacles. While it has undoubtedly enhanced learning experiences and fostered global integration. This approach will lead to a more promising future for Nigeria as it confidently steps into the era driven by information and technology. In conclusion, for Nigeria to effectively leverage the benefits of globalization in education a well-planned strategy is essential. This involves investing in infrastructure to bridge the digital divide; by striking a balance between global influences and local requirements, Nigeria can harness globalization to develop a more competitive, inclusive, and globally competent populace.

Based on the discussions in the chapter, the following recommendations were made:

1. Nigeria must design some deliberate policy to combat the attrition rate by putting in place a reward mechanism for those that choose to return, improve the quality and standard of education at home country to world class status and erect some international bureaucratic barriers that could discourage foreign studies and enhance effective utilization of human mental resources within the knowledge economy.
2. There is urgent need for better funding at all levels of education to meet the demands of globalization. This increased support is needed for the basic acquisition of relevant digital research equipment.
3. There is the need for continuous revision of the Curriculum content in order to determine and accommodate new and effective scope and practices relative to international curriculum for particular programmes for particular assessment.
4. The socio-cultural, political and economic environment should be considered before any idea or policy is introduced or imitated into the education system.

5. The institution must globalize her educational system, must integrate information communication technology into its academic system and other day to day administration of the institution. This will enrich its educational contents and pedagogical strategies.

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CHAPTER FOUR

THE CURRICULUM AND TRADITIONAL EDUCATION IN NIGERIA

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Introduction

The concept of curriculum finds its roots in ancient civilisations, where education served as a channel for cultural transmission and societal development. The term itself originates from the Latin *currere*, meaning ‘racecourse’ or ‘a running, course, career’, symbolising the educational journey undertaken by learners in pursuit of knowledge, skills, and personal growth. In ancient Babylonia, curriculum design was shaped by prevailing cultural norms and value systems, reflecting the traditions and priorities of the society. Culture refers to the established practices and customs within a community, while *values* denote the principles held in high regard by that society. The foundations of the modern curriculum are often attributed to John Franklin Bobbitt, an American educator, who defined curriculum as ‘the course of deeds and experiences through which children become mature and successful individuals in life’ in his book “The Curriculum” published in 1918, cited in (Liu, 2017). The Curriculum is more encompassing in society since various segments in society are connected to a specific type of curriculum in society. Longstreet and Shane (1993) gave curriculum orientations to be child-centred, society-centred, and knowledge-centred, or varied in nature, to guide educational thought. These orientations reflect differing philosophical underpinnings and priorities in curriculum design. More recently, Awofala and Sopekan (2023) emphasised the need for curriculum reform in Nigeria to respond to global trends, technological advancement, and the demands of a lively labour market. Their work stresses the importance of aligning curriculum with national development goals and learner diversity. Curriculum is vital to education, functioning as the heart of the school system by shaping pedagogical goals and methods. It structures teaching and learning, aligning educational goals with societal needs (Alvior, 2014).

Forms of Curriculum

Curriculum worldwide reflects this broad scope. 'Curriculum-in-use' denotes the content teachers actively apply during instruction, while Cuban (1992) describes the 'taught curriculum' as shaped by teachers' beliefs, influencing both interpretation and methodology. In contrast, the "intended curriculum" represents the formal, officially adopted framework, a documented representation of educational theories, principles, and intentions surrounding schooling, instruction, and learning. This encompasses prescribed materials such as textbooks and district curriculum guides. "Awofala and Sopekan (2023) highlighted the need to distinguish curriculum types, especially in Nigeria, where gaps often exist between policy and practice." The *concomitant curriculum* encompasses values and behaviours transmitted through familial and cultural settings, such as religious institutions and everyday interactions. These informal lessons,

in ethics, spirituality, and social norms, play a vital role in shaping learners' identities. Woodhouse (2023) notes that such informal curricula often reflect the interests of dominant societal groups, subtly reinforcing existing hierarchies. Similarly, the *hidden curriculum* operates within the school's organisational culture, influencing learners through unspoken expectations and institutional routines. Ezediniru (2023) argues that Nigerian schools often promote conformity and deference to authority, which may discourage critical thinking and civic engagement. Gardner, cited in Kochhar (2009), aptly remarked: 'We learn simply by the exposure of living. Much that passes for education is not education but ritual. The fact is that we are educated when we know it least.' Social roles are often constructed and reinforced through both formal instruction and hidden curricular practices, resulting in gender-related issues being addressed consciously and unconsciously within society. Within curriculum theory, the *null curriculum* refers to those topics and concepts that are deliberately excluded from formal instruction. Such omissions signal to learners that these elements are of lesser importance in their societal relevance. In other words, the *received curriculum* refers to the knowledge, attitudes, and values that learners internalise through classroom interactions with subject teachers, whether formally delivered or informally experienced. This dimension reflects the interpretive role of educators in shaping learners' understanding and engagement with curriculum content. The *rhetorical curriculum* comprises ideas and propositions advanced by stakeholders in the educational process. In Nigeria, recent reforms under the Universal Basic Education Programme and the revised 9-Year Basic Education Curriculum have been shaped by such rhetorical inputs, aiming to align education with national development goals (Igbokwe, 2015). The *thematic curriculum*, meanwhile, is an instructional approach that integrates attitudes, skills, conceptual knowledge, learning values, and creative thinking through well-structured themes (Siliguri, 2023). This seeks to create meaningful connections between academic learning and real-life experiences, thereby enhancing relevance and learner engagement (Novtryananda, 2021). Nigerian curriculum reform efforts have increasingly embraced thematic integration, particularly in Basic Science and Technology, to foster interdisciplinary learning and practical application (Awofala & Sopekan, 2023). Cortes (1981) describes the *societal curriculum* as an expansive, informal, and continuous learning process shaped by various socialising agents, including family, peer groups, religious institutions, communities, mass media, occupations, and other societal structures. This curriculum educates individuals across the lifespan, often outside formal school systems, and profoundly influences values, beliefs, and cultural norms. Recently, scholarship has highlighted the role of societal curriculum in addressing emerging social issues such as religious extremism, youth unemployment, and cultural fragmentation. Oyetunde (2020) argues that the Social Studies curriculum must evolve to reflect these societal realities, themes that resonate with learners' lived experiences. Also, Adeyemi (2021) emphasises the need for curriculum reform that promotes civic responsibility and cultural awareness in response to Nigeria's socio-political challenges. The *phantom curriculum* encompasses implicit messages and cultural transmissions that learners acquire through media exposure and societal discourse. It consists of unstructured, yet influential content disseminated through oral traditions, television, radio, newspapers, and local announcements, including historical forms such as the town crier. Agiugochukwu and Duru (2022) note that contemporary education in Nigeria must contend with these informal influences, which often shape learners' perceptions more powerfully than formal instruction.

Furthermore, Wilson (2004) describes the *electronic curriculum* as the body of knowledge and experiences learners encounter through digital platforms, including internet searches, social media, and electronic communication. This curriculum may be formal or informal, with content ranging from explicit to implicit, and from beneficial to harmful, as well as factual to misleading, depending largely on individual interpretation and levels of digital literacy. The Federal Ministry of Education's revised national curriculum, set to roll out in the 2025/2026 academic year, places greater emphasis on digital literacy, coding, and hybrid learning models to prepare students for the demands of a digital economy. Ifarajimi (2024) emphasises the importance of adopting learner-centred and competency-based approaches that integrate digital technologies responsibly, ensuring equity, ethical use, and relevance in the digital age. The diversity of curriculum types affirms that curricular practices have long existed across societies, well before curriculum emerged as a formal field of academic study.

Therefore, this work is anchored in the framework of *historical sociology*, which examines the development of societal structures and institutions, tracing their persistence and influence on contemporary contexts. This perspective enables a critical exploration of curriculum processes in Nigeria, from traditional educational systems to post-independence reforms. Odia and Aghahowa (2024) highlight the role of social studies in fostering civic engagement and national identity, with Abiodun (2024) on the need for periodic curriculum review to address challenges rooted in historical legacies and institutional inertia. These insights underscore the relevance of historical sociology in understanding how curriculum development both shapes and is shaped by Nigeria's socio-political trajectory.

Curriculum Process during the Traditional Era in Nigeria

Before the arrival of colonial influence, African societies, including those within present-day Nigeria, had well-established systems of education that catered to both young and adult learners. This indigenous educational enterprise was not pursued for certification or employment guarantees, but rather as a purposeful and goal-oriented process. It was deeply embedded in the social fabric, designed to meet the immediate needs of individuals and the wider community. Education was holistic, encompassing moral instruction, vocational training, cultural transmission, and social integration. It was delivered through informal yet structured channels such as family units, age-grade systems, religious institutions, and community elders. Iruoghene and Adesanwo (2023) observed that traditional education in Nigeria is helpful in instilling values, skills, and societal norms, ensuring continuity and cohesion across generations.

It can be asserted that, before colonialism, Africans were indeed educated, albeit not in the Western sense. If education is understood as the cultivation of competence, the development of skills, and the acquisition of knowledge, then traditional Nigerian societies were actively engaged in educational processes. This form of curriculum was experiential, context-driven, and responsive to the realities of daily life, making it both effective and enduring. African training systems before colonial intervention were both adequate and functional, performing a wide range of educational tasks essential to societal continuity and development. These systems were not merely informal gatherings but structured processes of knowledge transmission, skill acquisition, and value formation. The existence of such training systems affirms the coexistence of curriculum, though in a non-Western form, long before the advent of colonial education. This

precolonial curriculum is often referred to as the **informal curriculum**, rooted in oral traditions, communal practices, and experiential learning. It encompassed moral instruction, vocational training, cultural rites, and social responsibilities tailored to the needs of the community. Also, Seroto (2017) noted that indigenous education in Southern Africa was deeply integrated with the social, artistic, religious, and recreational life of the people, transmitted through storytelling, rituals, and apprenticeship models. Additionally, Josua *et al* (2022) argued that curriculum responsiveness in precolonial Africa was shaped by socio-economic and cultural imperatives, demonstrating its relevance and adaptability. Education, like curriculum, is as old as human civilisation itself. Africa's diverse cultural traditions show that curriculum development extends beyond Western models, reflecting local values and aspirations. Informal education, though less structured, nurtures children's potential within social norms and enriches formal learning by embedding knowledge in daily life experiences. Learning in society is intergenerational, occurring through observation, storytelling, and communal participation, and fostering values like cooperation and resilience. Yusuf (2024) emphasizes Nigeria's informal education, tutorial centres, and community initiatives as key supplements to formal schooling. Kareem (2024) adds that such systems build practical skills for entrepreneurship, tackling youth unemployment and advancing inclusive development.

These informal structures not only transmit cultural knowledge but also serve as adaptive mechanisms for lifelong learning, especially in contexts where formal education may be inaccessible. Informal education remains profoundly relevant in contemporary Nigeria, offering experiential learning that complements and often refines the formal school system. It plays a critical role in addressing societal misconceptions and bridging gaps in structured instruction, particularly in rural communities. Through everyday interactions, cultural practices, and communal engagement, informal education continues to shape learners' understanding of their environment and social responsibilities.

Traditional education agencies, home, religious bodies, peer groups, markets, farms, and roadside interactions offer rich contexts that nurture natural potential. Wordu and Chikendu (2024) stress the importance of integrating formal and informal education to build an inclusive learning system in Nigeria, noting both administrative challenges and opportunities in higher education. Informal education also fosters personal growth and social cohesion. Kareem (2024) highlights its impact on youth employment through practical skill development via apprenticeships, vocational training, and community learning. Charles (2021) observes that informal education reduces inequality by broadening access and promoting lifelong learning, particularly in rural and marginalised communities. These insights affirm its role as a dynamic force shaping Nigeria's evolving educational landscape.

Intentions of the Traditional Curriculum in Nigeria

Nigeria's traditional curriculum was grounded in communal values and cultural continuity, promoting character development, social integration, and practical skills through a holistic educational approach. Amaele (2004) outlined key goals of traditional education: preserving cultural heritage across kinship lines, helping youth adapt to their environment, and fostering awareness that societal survival relies on sustaining inherited laws, language, and values. Ehindero (1986) identified key principles of pre-colonial education focused on holistic child

development, intellectual, physical, and moral. It fostered community engagement, respect for elders, vocational competence, and a strong ‘we-feeling’ of communal identity, promoting cultural heritage and active participation in societal life.

Iruoghene and Adesanwo (2023) identify seven core goals of traditional Nigerian education, such as moral integrity, environmental adaptation, and cultural preservation. Olurotimi (2022) views these systems as sustainable models for community development and identity formation amid globalisation and cultural decline. Together, these perspectives affirm the lasting relevance of indigenous education and its potential role in modern curriculum design. Ocitti (1973) outlined key aims of traditional African education, especially in Nigeria: preserving clan heritage, preparing children with essential knowledge and norms for adulthood, and fostering community belonging. He also stressed character formation through discipline, cultivating traits like sociability, communal spirit, bravery, modesty, and obedience qualities expected to emerge as children mature. These aims reflect a curriculum deeply embedded in cultural continuity and social cohesion. By extension, Ibe-Moses and Okafor (2021) remarked that traditional education systems prioritised vocational competence, moral uprightness, and civic responsibility, offering a balanced framework for personal and societal development. Such insights affirm that traditional education was not informal in the sense of being unstructured or incidental, but rather a deliberate and enduring system of curriculum delivery, one that remains relevant in contemporary discourse on culturally responsive education.

Elements of the Traditional Curriculum

In curriculum discourse, *elements* refer to the constituent parts that define and shape a curriculum’s structure and purpose. While various models have been proposed by scholars across disciplines, the traditional curriculum in Nigeria is distinguished by its integration of occupational, moral, and cultural components, delivered through informal yet intentional processes. This curriculum provided occupational and professional training by immersing younger members of society in practical activities, both consciously and unconsciously, within their immediate environments. For instance, fishing was emphasised in riverine communities, while farming dominated forested regions. Craftwork such as basket weaving, mat making, and cloth production flourished in areas where raw materials were readily available, particularly in village settlements.

Additionally, indigenous knowledge of herbal medicine was passed down through generations, with learners acquiring an understanding of local plants, their uses, and their efficacy in treating specific ailments with minimal risk. These elements reflect a curriculum that was not only functional but also responsive to ecological and cultural contexts. Iruoghene and Adesanwo (2023) affirm that traditional education systems in Nigeria were designed to equip individuals with survival skills, communal values, and environmental literacy. Mustapha (2025) further argued that curriculum relevance must be grounded in context, noting that traditional models offer valuable insights for sustainable national development when adapted thoughtfully into modern frameworks. In traditional Nigerian society, every individual underwent some form of training, ensuring that each person occupied a specific niche within the community. This system was designed to prevent idleness from childhood through to adulthood, fostering productivity and social responsibility. The curriculum of traditional education encompassed both physical

and intellectual training, delivered through experiential and communal methods. Young members of society were taught acrobatic displays, drumming, dancing, wrestling, and other physical skills that not only enhanced health but also served as entertainment during communal ceremonies such as funerals, marriages, and others. These activities often doubled as informal competitions, with winners celebrated through tangible rewards drawn from the local environment. As Mgbor (2005) notes, physical activities such as wrestling, climbing, and dancing were integral to traditional education, contributing to character development and social bonding. Intellectual training enabled individuals to organise their thoughts, interpret their environment, and engage meaningfully with their community.

This form of learning was rooted in life experiences and interactions with knowledgeable adults, including elders, artisans, and religious leaders. According to Iruoghene and Adesanwo (2023), traditional education fostered intellectual growth through storytelling, observation, and apprenticeship, equipping learners with critical thinking skills and cultural literacy. Together, these elements of traditional education cultivated well-rounded individuals, physically capable, intellectually engaged, and socially responsible, prepared to contribute meaningfully to their communities. Intellectual activities included numeration, storytelling, adages, rhymes, folklores, inherited records, and puzzles, all designed to sharpen memory, stimulate reasoning, and transmit cultural knowledge. These practices enabled learners to organise their thoughts, interpret their environment, and engage meaningfully with societal norms. Vocational training was guided by practical principles rooted in local contexts. Individuals were trained in skills relevant to their geographical and economic environments, ensuring mastery in specific occupations. Akpan *et al* (2021) note, vocational education in Nigeria originated within family circles and was transmitted through apprenticeship systems, making it a vital tool for survival and community development.

Character training was central, focusing on respect for elders, proper manners (including table and toilet etiquette), greetings, body composure, community participation, and the promotion of cultural heritage. Learners were also taught facts about their natural environment, fostering ecological awareness and responsible living. Kayode-Olawoyin (2021) emphasises that traditional education instilled values such as sociability, modesty, and communal responsibility, attributes that remain essential for social cohesion in modern Nigeria. Iruoghene and Adesanwo (2023) further affirm that these elements of traditional education were not incidental but deliberately structured to produce morally upright, intellectually capable, and vocationally skilled individuals. Together, they formed a curriculum that was both contextually relevant and enduring in its impact.

Characteristics of the Traditional Curriculum in Nigeria

Traditional education in Nigeria followed a structured and culturally rooted curriculum aimed at nurturing the child in a holistic manner. Its characteristics reflect a deep understanding of communal responsibility, developmental psychology, and experiential learning. Education was a communal endeavour. Every member of the society played an active role in the upbringing of the child. This collective involvement ensured that no child was left unguided and that the values, skills, and expectations of the community were consistently reinforced. The sincerity of adult

participation fostered trust and discipline, as children rarely questioned the authority of those guiding them. Iruoghene and Adesanwo (2023) affirmed that traditional education is deeply rooted in socialisation, with the community acting as both the curriculum and the classroom. This ensured continuity of lineage, cultural preservation, and social cohesion.

The methodology of the traditional curriculum was multi-faceted, both in its goals and means employed to achieve them. Education was not confined to a single pathway; rather, it embraced diverse approaches, storytelling, observation, imitation, apprenticeship, and ritual, customised to the learner's context and developmental stage. Learning was progressive and aligned with the physical, emotional, and mental growth of the child. Instruction was informal, often undocumented, but deeply internalised. Adults relied on their own lived experiences and prior training to guide the younger generation, ensuring that knowledge was passed down with authenticity and relevance. The traditional curriculum was adaptive to the learner's environment and responsive to societal needs.

It did not rely on written content, but on exposure, repetition, and reinforcement. Children learned by doing, through participation in farming, craftwork, ceremonies, and communal tasks. These real-life exposures model promoted retention, skill mastery, and cultural fluency. Recent studies advocate for the integration of these principles into modern curriculum design. For instance, this academic review recommends community engagement and elder involvement as strategies for reviving traditional education and enriching formal schooling in Nigeria. Traditional education in Nigeria was decentralised, context-driven, and deeply entwined with the cultural and spiritual fabric of society.

Its structure was fluid, designed to meet the specific needs of each community through observed learning and oral transmission. The scope of specialised training was often restricted to specific communities. Expertise in crafts, medicine, or ceremonial roles was typically concentrated in areas where the necessary resources, traditions, or lineage existed. If a skill or service was not locally available, individuals would travel to other communities to access the required knowledge or assistance. This decentralised model fostered inter-community collaboration and preserved regional specialisations. As Imam (2012) observed, the traditional curriculum was functional because it was tailored to meet the immediate needs of each society. Training was practical, relevant, and aligned with the socio-economic realities of the learners.

Oral tradition was the primary medium of instruction and cultural transmission. Knowledge was passed down through storytelling, proverbs, chants, songs, and ritual performances. While there were limited instances of recorded information, often in symbolic or mnemonic forms, most learning occurred through verbal exchange and lived experience. Ezeigbo (2021) further argues that folklore and oral narratives remain vital tools for educating Nigerian youth, especially in restoring cultural values and identity. Educational processes were infused with spiritual beliefs, moral instruction, and communal values. Learning was not confined to secular knowledge but extended to understanding one's role within the cosmological and social order. Kayode-Olawoyin (2021) noted that traditional education systems transmitted needed values and communal responsibility through integrated moral and spiritual instruction.

This fusion ensured that education was not only about skill acquisition but also about character formation and cultural continuity. Traditional education occurred at any time and in any place, farms, markets, homes, shrines, or communal gatherings. There were no designated venues or rigid schedules. Learning was embedded in daily life, making it accessible and continuous. This informality did not imply a lack of structure. Rather, it reflected an adaptive pedagogy that responded to the learner's developmental stage, environmental context, and societal expectations. Instruction was progressive, often undocumented, and guided by elders who had themselves been shaped by the same system.

Traditional education in Nigeria was not confined to childhood or adolescence; it was a lifelong and lifewide process. Learning occurred continuously across the lifespan and in diverse contexts, reflecting the dynamic nature of society and the evolving roles of individuals within it. Education did not end with youth. As individuals mature, they continue to acquire new knowledge, refine existing skills, and adapt to changing responsibilities. This progression was often tied to practical experience, community engagement, and spiritual growth. Proficiency deepened through repetition, mentorship, and participation in communal life. Imam (2012) affirms that traditional education was functional precisely because it responded to the needs of individuals at every stage of life, enabling them to contribute meaningfully to their communities.

Similarly, Udosen (2013) explores the philosophy of lifelong learning in Nigeria, noting that traditional systems embraced informal, self-motivated, and universal participation long before these concepts were formalised in modern education. Learning also occurred across multiple domains, not just in designated spaces like schools or shrines, but in homes, farms, markets, ceremonies, and social gatherings. Every setting was a potential site of education, and every interaction a chance to learn. This lifewide approach ensured that individuals developed a broad repertoire of skills, values, and cultural knowledge. Ezugwu (2019) highlights that lifelong and lifewide learning are essential for transformation in Nigeria, especially in adapting to a knowledge-based society. Traditional education exemplified this by integrating religion, ethics, and practical knowledge into everyday life, making learning inseparable from living.

As individuals practised their crafts, whether farming, weaving, healing, or storytelling, their level of expertise increased. Mastery was not achieved through certification but through lived experience, community recognition, and intergenerational transmission. This process reinforced the value of perseverance, observation, and mentorship. Ezugwu (2019) highlights that lifelong and lifewide learning are essential for transformation in Nigeria, especially in adapting to a knowledge-based society. Traditional education exemplified this by integrating religion, ethics, and practical knowledge into everyday life, making learning inseparable from living.

Critical Reflections on the Structure and Limitations of Nigerian Traditional Education

Traditional education in Nigeria was a culturally responsive and community-driven system that prioritised functionality, moral development, and social cohesion. While it offered numerous advantages, it also had limitations that shaped its evolution and relevance in contemporary discourse. Traditional education in Nigeria was inclusive and adaptive, offering every member of society the opportunity to receive appropriate training based on their natural abilities and talents. This system ensured that individuals were equipped to contribute meaningfully to their communities, with roles assigned according to aptitude, environment, and communal needs.

However, despite its functionality and cultural relevance, traditional education also exhibited structural limitations that affected its accessibility, adaptability, and scalability.

Traditional education was deeply conservative, often resistant to change or external influence. Its rules and regulations were strict, and discipline was enforced through fear of spiritual or communal consequences. While this instilled a strong sense of moral comportment, it also created an atmosphere where questioning or innovation was discouraged. As Iruoghene and Adesanwo (2023) observed, the rigidity of traditional education limited its capacity for reform and adaptation, especially in the face of modern educational demands. Instruction was often hidden or informal, revealed only when necessary. This lack of transparency made it difficult to conduct exhaustive evaluations or implement regular improvements. Without formal documentation or oversight, the system relied heavily on oral transmission and personal experience, which varied widely across communities.

Conclusion

This study traces the origin of curriculum as an academic field to the work of Franklin Bobbitt in his publication of 1918. Also, the traditional education in Nigeria established the existence of the curriculum with proof in the elements and the characteristics of the various curricula. Therefore, the curriculum predated when it became a field of study in academic cycles.

Recommendations

A retrospection on returning life to the traditional curriculum in the schooling process is essential, such that responding to global relevance will begin at home. In the experience of the traditional society, with functional, accommodating, and every individual contributing their quota effectively in a peaceful environment, there is a need for comparative analysis with the current trend in society, which will guide in making appropriate decisions.

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CHAPTER FIVE

CHALLENGES AND PROSPECTS OF IN-SERVICE TRAINING AND CONTINUOUS PROFESSIONAL DEVELOPMENT OF TEACHERS IN ADAMAWA STATE, NIGERIA

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Introduction

Education is universally recognized as the most potent instrument for social, economic, and technological advancement. It is the bedrock of national development and the foundation upon which every other sector is built. In the Nigerian context, the National Policy on Education (NPE, 2013) affirms that “no educational system can rise above the quality of its teachers.” This assertion underscores the centrality of teachers in the successful implementation of educational policies and programmes. As agents of change and nation-building, teachers must continually improve their knowledge, skills, and professional competence to meet the evolving demands of modern education. In-service training and continuous professional development (CPD) have, therefore, become indispensable components of teacher education. In-service training refers to organized learning opportunities provided to serving teachers to upgrade their pedagogical skills, content knowledge, and instructional effectiveness while on the job. Continuous professional development, on the other hand, encompasses a lifelong process through which teachers engage in structured and reflective learning to enhance their professional practice, adapt to innovations, and respond effectively to emerging educational challenges. In Nigeria, these two concepts are closely interlinked and serve as strategic tools for maintaining teaching quality and educational standards across all levels of schooling.

In Adamawa State, education faces numerous challenges, including inadequate teacher preparation and limited infrastructure, which collectively hinder the achievement of quality education. Despite policy commitments and institutional efforts, many teachers in public secondary schools still lack access to regular training and meaningful professional growth opportunities. The rapid expansion of schools and increased student enrolment further exacerbate the demand for qualified and competent teachers who can effectively deliver the curriculum. Institutions such as the Federal College of Education (FCE) and Modibbo Adama University’s Faculty of Education have contributed to teacher preparation and retraining, yet systemic gaps persist.

The importance of in-service training and CPD lies not only in enhancing instructional quality but also in promoting teacher motivation, professionalism, and career advancement. As Ojo, A.O. (2024) observes, without adequately prepared and well-supported teachers, the dream of achieving educational transformation remains elusive.

Therefore, a sustained focus on in-service training and continuous professional development is crucial for strengthening teacher capacity, improving student learning outcomes, and achieving the broader goals of educational reform in Adamawa State and Nigeria at large.

Concept of In-Service Training and Continuous Professional Development (CPD)

In-service training and Continuous Professional Development (CPD) are two interrelated strategies for enhancing teacher quality and ensuring that educators remain current in an ever-evolving educational landscape. In-service training refers to structured learning opportunities organized for teachers who are already in active service, intending to refresh their knowledge, upgrade their pedagogical skills, and improve classroom effectiveness. It is often short-term, addressing immediate instructional challenges such as curriculum reforms, assessment techniques, classroom management, or the integration of new technologies into teaching. In the Nigerian education context, in-service training is usually organized by the Ministry of Education, Teaching Service Boards, or development partners, and may take the form of workshops, seminars, conferences, or refresher courses (Akinwumi, J. 2023). Continuous Professional Development (CPD), on the other hand, is a broader and ongoing process that extends beyond occasional training. It involves the systematic and continuous acquisition of knowledge, skills, and competencies that enhance teachers' professional practice, career growth, and overall contribution to school improvement. According to Anadi, S. (2023), professionalism involves acquiring specialized education and training that distinguishes teaching from ordinary occupations, while sustained teacher learning is central to achieving high standards in education. Continuing Professional Development (CPD) seeks to empower teachers as reflective practitioners who can critically evaluate their own teaching, engage in peer collaboration, and adapt to emerging trends in pedagogy and curriculum. This broader approach to professional growth moves beyond occasional training to a continuous process that enhances teachers' professional practice, career growth, and overall contribution to school improvement.

Effective CPD recognizes that teacher learning is a lifelong process rather than a one-off event. It promotes a culture of professional inquiry in which teachers continually reflect on their classroom practices and seek innovative ways to improve student learning outcomes. It also encourages teachers to become part of professional networks, mentorship programs, and communities of practice that foster collective growth. In the Nigerian context, CPD is particularly important given the challenges of poor teacher preparation, inadequate supervision, and rapid curriculum changes. By equipping teachers with the right competencies, CPD contributes significantly to the realization of the goals of the National Policy on Education (NPE, 2013), which emphasizes teacher quality as the foundation of educational effectiveness.

Moreover, the effectiveness of CPD depends on several factors such as government policy support, institutional leadership, resource availability, and teachers' motivation to learn. When properly implemented, CPD not only enhances teacher performance and student achievement but also promotes professionalism, accountability, and job satisfaction among educators. Thus, both in-service training and CPD are indispensable for sustaining teacher quality, improving educational standards, and fostering innovation in the school system.

Teacher Quality and the Role of Policy

The Nigerian National Policy on Education (FRN, 2013) clearly emphasizes that *no educational system can rise above the quality of its teachers*. This statement reflects the central role teachers play in shaping educational outcomes and driving national development. Teachers are not merely transmitters of knowledge; they are the architects of learning experiences, responsible for translating educational policies into effective classroom practices. Consequently, the quality, competence, and professional growth of teachers determine, to a large extent, the success of educational reforms and the realization of national educational goals.

According to Ogundele (2024), the quality of a nation's citizens depends critically, though not exclusively, on the quality of its teachers. This means that teacher effectiveness directly influences the intellectual, moral, and social development of learners, who in turn shape the society's future. In a similar vein, Ojo, A.O. (2024) asserts that without an adequate number of inspired and well-prepared teachers, no nation can sustain meaningful educational reform. Teachers, therefore, represent both the foundation and the future of education. Recognizing this, educational policies at both federal and state levels in Nigeria have consistently highlighted teacher development as a key reform priority. These policies advocate for systematic in-service training and continuous professional development (CPD) as mechanisms for maintaining teacher competence and ensuring instructional quality. However, despite these policy provisions, implementation gaps persist across many states, including Adamawa, where resource constraints, weak institutional frameworks, and inconsistent monitoring mechanisms have hindered the achievement of these goals.

As a result, there exists a disparity between policy intentions and classroom realities. While national policies articulate a vision of a professionalized, well-equipped teaching workforce, the actual conditions under which teachers work, especially in Adamawa State, often undermine this vision. The effectiveness of teacher education policies thus depends not only on their formulation but also on sustained commitment, adequate funding, and local adaptation. The disconnect between policy and practice forms the backdrop to many of the educational challenges in Adamawa State, where improving teacher quality remains a persistent struggle despite ongoing reform efforts.

Educational Challenges in Adamawa State

Adamawa State, located in the North-East geopolitical zone of Nigeria, presents a unique educational landscape characterized by both opportunities and significant challenges. Education, globally recognized as a key driver of development, social transformation, and human capital formation, has not fully realized its potential in Adamawa State due to a convergence of socio-political, economic, and institutional constraints. While education remains the bedrock for modernization and the empowerment of citizens, the delivery and quality of education in the state have been persistently hindered by several interrelated factors.

One of the most pressing challenges is the issue of insecurity caused by insurgency and banditry, which has severely disrupted the educational process in many communities, particularly in rural areas. Schools in insurgency-prone zones have been destroyed or closed, leading to a decline in school attendance and teacher retention. Teachers who remain in service often work under stressful and unsafe conditions, which negatively affect their performance and morale. In addition, internal displacement has led to the overcrowding of schools in safer regions, putting pressure on limited facilities and resources.

A significant challenge confronting teacher development in Adamawa State is the complex interplay between the state's pronounced ethno-religious diversity, political instability, and the politicization of education. Adamawa is characterized by a mosaic of diverse ethnic and religious groups, including a near-equal split between its Christian and Muslim populations. While this diversity is a source of cultural richness, it can become a source of contention when manipulated for political gain. This politicization manifests in various ways that directly undermine educational quality. For instance, the uneven distribution of educational resources is a persistent problem, with allocations often skewed toward areas based on political loyalties rather than genuine educational need. Favored local government areas may receive better infrastructure, more learning materials, and additional teacher training slots, while marginalized communities are left with dilapidated schools and under-resourced teachers. This practice creates significant disparities in educational quality, further exacerbating inequalities between urban and rural areas, and between different local government areas within the state.

Poverty and economic hardship further exacerbate the situation. A large proportion of parents are unable to afford basic educational materials, thereby reducing student attendance and engagement. For teachers, low remuneration and poor welfare conditions make it difficult to remain motivated or to invest in self-improvement through professional development. Consequently, the teaching profession in the state suffers from low prestige and high turnover, with many qualified teachers migrating to other states or sectors for better opportunities. Infrastructural decay also poses a serious obstacle. Many public secondary schools in Adamawa State operate without adequate

classrooms, laboratories, libraries, or ICT facilities. The lack of conducive learning environments undermines the delivery of quality instruction and limits the application of modern teaching methodologies. This infrastructural deficit also constrains the implementation of in-service training and Continuous Professional Development (CPD) programs, which often require functional facilities, teaching aids, and digital resources.

Moreover, institutional weaknesses such as poor supervision, inadequate funding, and weak policy implementation further diminish educational effectiveness. While state and federal governments have initiated reforms aimed at improving teacher education and secondary school quality, the absence of sustained financial and administrative commitment often stalls progress.

The combined effect of these challenges is a system where the professional development of teachers is hindered at multiple levels. Inconsistent policy implementation, weak monitoring, and political interference create a fragile and inequitable educational environment. For many teachers, professional growth is not a guaranteed outcome of their efforts but rather a circumstance influenced by political and ethnic dynamics beyond their control. This disconnect fundamentally undermines efforts to build a qualified, motivated, and professionally developed teaching workforce across Adamawa State. Despite these challenges, there is a growing recognition among stakeholders that revitalizing teacher quality through in-service training and continuous professional development is crucial to rebuilding the educational system. Strengthening teacher capacity and motivation remains the most effective strategy for addressing the state's educational crisis, enhancing learning outcomes, and promoting long-term social transformation.

Current State of In-Service Training and CPD in Adamawa State

In response to these challenges, Adamawa State has embraced in-service training and CPD initiatives through institutions such as the Federal College of Education (FCE), the Faculty of Education at Modibbo Adama University (MAU), and the National Teachers' Institute (NTI). These bodies organize refresher courses, sandwich degree programmes, workshops, and conferences to build teacher capacity. However, much of the training remains fragmented, sporadic, and donor-driven rather than systematically integrated into teacher career pathways. Teachers are often treated as passive recipients of knowledge, limiting the transformative impact of these programmes (Tunde, K. 2023).

Nevertheless, innovative practices are emerging. Some teachers in Adamawa now participate in curriculum reviews, classroom-based research, and peer mentoring, treating the classroom as a learning laboratory (Afolabi, O.L. 2022). Out-of-school engagements, including partnerships with NGOs and community organizations, have further broadened professional development opportunities. These efforts point to the

potential of CPD to empower teachers not only as implementers of policy but also as leaders of educational innovation and reform.

Hindrances to Effective In-Service Training and Continuous Professional Development of Teachers in Adamawa State

Professional development requires that teachers aim to teach better than they have ever taught before. It requires a shift from the usual traditional method of classroom teaching to effective, innovative teaching. Like students who learn to acquire new knowledge and ideas, teachers must be actively involved in learning, acquiring new ideas, and having opportunities to discuss, reflect upon, try out, and acquire better instructional approaches. Professional development of teachers involves retraining teachers in curriculum and subject content. Retraining increases knowledge and improves the skills and competencies of serving teachers. Despite the recognized importance of in-service training and continuous professional development (CPD) for secondary school teachers, several obstacles hinder their effectiveness in Adamawa State:

Inadequate Government Support and Funding: Government support and financing play a decisive role in determining the success of in-service training and continuous professional development (CPD) programmes. However, evidence suggests that teacher development in Adamawa State suffers from inconsistent policy implementation, weak institutional monitoring, and insufficient budgetary allocation. These issues reflect broader national challenges in sustaining professional growth among teachers in Nigeria. Although education is widely recognized as a key driver of national development, the level of investment in the sector remains inadequate. Recent data challenge the generalization that Adamawa State's annual allocations consistently fall below international benchmarks. Specifically, the 2024 budget allocated 21.25% of its total expenditure to education, placing it among the states that meet or exceed the UNESCO-recommended range of 15–20%. Even with increased allocation, challenges in funding implementation and mismanagement can undermine the impact. For example, a 2025 study examining UBE implementation in Adamawa noted insufficient funding as a hindering factor, citing the commonly misquoted UNESCO 26% figure.

Despite this notable budgetary commitment, evidence from within Nigeria suggests that inadequate funding remains a significant challenge for the education sector, impacting the quality of teaching materials, infrastructure, and the provision of effective workshops. Moreover, inconsistent government commitment and the absence of a coordinated framework for teacher development have made most in-service and CPD programs irregular and unsustainable. Analyses from different regions and timeframes consistently identify weak policy implementation, inadequate funding, institutional corruption, and a lack of political will as key constraints. This results in professional development being treated as a series of sporadic events rather than a sustained process of growth and reflection. The result is a system where professional development is often treated as a one-off event rather than a continuous process of growth and reflection.

Shortage of Facilities and Equipment: Effective in-service training and continuous professional development (CPD) depend on the availability of adequate teaching and learning resources. Modern teacher development now extends beyond workshops and seminars to include access to ICT tools, well-equipped laboratories, libraries, and digital learning platforms that facilitate interactive and self-directed learning. However, in many post-primary schools across Adamawa State, such facilities remain insufficient or non-functional, thereby limiting teachers' exposure to innovative instructional methods and 21st-century pedagogical tools. According to Adeyemi, A. O., & Olalekan, M. (2021). The absence of functional ICT infrastructure in schools continues to hinder teachers' ability to integrate technology into classroom instruction and professional learning. Similarly, the Universal Basic Education Commission (UBEC, 2021) reports that inadequate facilities remain a major constraint in teacher training centers across Nigeria, particularly in the North-East region, where insecurity and underinvestment have disrupted educational development. This shortage of facilities not only affects teachers' productivity but also discourages participation in digital-based CPD programmes. The infusion of technology into education is a critical aspect of improving learning outcomes, yet it requires teachers who are skilled in using digital tools effectively. However, the absence of functional ICT infrastructure continues to hinder this progress, particularly in regions like Adamawa State. Studies on educational technology in Nigeria consistently point to challenges such as inadequate power supply, poor internet connectivity, and limited access to hardware as significant barriers to effective technology integration and professional learning. Without access to such resources and the necessary training to use them, efforts to improve teacher quality and classroom performance remain significantly constrained, a reality that persists across many states in Nigeria despite the increased emphasis on technology in education.

Weak Institutional Commitment: Institutional commitment plays a central role in ensuring the success of in-service training and continuous professional development (CPD) initiatives. In Adamawa State, however, weak administrative coordination and limited oversight by education authorities have significantly hindered the effectiveness of teacher development programmes. The state's school boards and supervisory bodies often fail to demonstrate consistent commitment to teacher growth, as training opportunities are neither systematically planned nor equitably implemented across schools. In many cases, priority is given to selected schools or teachers without clear criteria, leaving others neglected despite urgent developmental needs. This inconsistency creates disparities in teacher competence and morale across the education system. Furthermore, the recommended teacher–student ratio of 1:25 is rarely observed in public secondary schools, resulting in overcrowded classrooms that limit teachers' capacity to apply new instructional methods gained from training. Institutional inefficiency and weak policy enforcement are significant factors contributing to the poor quality of teacher supervision and professional advancement in many Nigerian states. As documented by studies on education policy implementation across the country, without strong institutional will, clearly defined standards, and transparent monitoring frameworks, Continuous Professional Development (CPD) programmes risk becoming ceremonial rather than transformative. This is particularly relevant in Adamawa State, where weak monitoring mechanisms and persistent implementation gaps have been observed. Therefore, strengthening institutional commitment and transparency is

essential for achieving meaningful and sustainable teacher development, ensuring that well-intentioned policies and budget allocations translate into tangible improvements in the classroom.

Lack of Coherent, Long-Term Planning: In Adamawa State, professional development programmes are often treated as isolated interventions rather than components of a structured, long-term teacher growth strategy. Most in-service training activities take the form of occasional workshops, seminars, or refresher courses organized by the Ministry of Education or donor agencies. For example, records from the Adamawa State Post Primary Schools Management Board (PPSMB, 2024) indicate that the last major state-wide in-service training for secondary school teachers was held in July 2024, focused on equipping teachers with the skills needed to implement the new curriculum and prepare students for standardized exams. Since then, training efforts have been sporadic and donor-driven, lacking a consistent framework for follow-up or impact assessment.

The lack of coherent planning further undermines the sustainability of teacher development outcomes. While training programs are conducted, the lack of follow-up and long-term evaluation means their effectiveness is rarely monitored. A study on CPD programs in colleges of education, for example, highlighted the "lack of a systematic and comprehensive training needs analysis" and weak institutional engagement as profound challenges. In Adamawa State, this is evident in the absence of an established mechanism for monitoring the long-term effects of training on teaching performance or student learning outcomes. Consequently, many teachers revert to traditional teaching methods after initial training sessions due to a lack of ongoing institutional support for implementation, reflection, or peer collaboration.

In-service training has become reactive rather than proactive due to a series of systemic challenges, including the absence of a long-term professional development policy, irregular funding, and weak coordination among stakeholders. To ensure CPD is effective, Adamawa State needs to implement a more deliberate approach. This includes adopting a structured development plan that aligns training content with national education priorities. Equally important are consistent funding and the establishment of robust mechanisms for ongoing mentorship, monitoring, and evaluation, which would support teachers beyond short-term interventions.

Way Forward/ Suggestions for Improving In-Service Training and CPD

To overcome these challenges and align teacher development with global standards, the following recommendations are proposed:

- **Strengthen Policy and Government Commitment:** The Adamawa State Government should prioritize teacher professional development as a central component of education reform. In addition, clear policies should mandate periodic in-service training and CPD for all teachers, with monitoring mechanisms to ensure compliance.
- **Increase Funding for Teacher Development:** The state government should allocate at least the UNESCO-recommended 20% of annual budget to education, with a clear earmark for teacher training and professional development. The

government can partner with international agencies, NGOs, and the private sector to mobilize additional resources for teacher capacity building.

- **Expand Access to ICT and Learning Facilities:** Adamawa State Government should integrate ICT tools into teacher training programmes and ensure that every secondary school has functional ICT laboratory. The government should also provide teachers with continuous exposure to digital learning resources, smart classrooms, and online CPD platforms.
- **Promote Collaborative Partnerships:** Adamawa State Government should strengthen partnerships with teacher training institutions such as NTI, FCE, and MAU to ensure structured, research-informed training and also encourage collaboration with professional associations, NGOs, and community organizations to expand CPD opportunities.
- **Institutionalize Long-Term Professional Development Plans:** The government should move beyond one-shot workshops by creating comprehensive CPD frameworks that include mentoring, peer review, classroom-based research, and continuous assessment of teacher growth. The government should also encourage teachers to engage in reflective practice, action research, and networking with colleagues to share best practices.
- **Ensure Equity and Standardization:** Adamawa State Government should apply transparent and equitable criteria in the distribution of resources for schools, ensuring that rural and underserved schools benefit equally. The government should also enforce adherence to the teacher–student ratio to improve classroom management and enhance teacher effectiveness.
- **Build Teacher Motivation and Retention:** The state government should introduce incentives such as career progression, recognition awards, and improved welfare packages for teachers who actively participate in CPD. Also, the government should organize periodic fora for teachers to voice challenges and contribute to policy decisions, thereby increasing ownership of the process.

Conclusion

For Adamawa State to meet global standards in secondary education, in-service training and continuous professional development of teachers must be treated as a cornerstone of educational reform. By addressing challenges of underfunding, inadequate facilities, and weak institutional commitment, and by implementing long-term, structured CPD strategies, the state can radically transform the quality of its teaching workforce. Such a transformation will not only improve student outcomes in both internal and external examinations but also contribute significantly to the state's socio-economic development. As teachers are the custodians of modernization, their empowerment through sustained professional development will remain the foundation of a resilient and progressive educational system.

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CHAPTER SIX

EDUCATIONAL POLICY INITIATIVES AND CHALLENGES OF IMPLEMENTATION IN NIGERIA

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Introduction

Nigeria's educational system is undergoing significant changes in the 21st century, influenced by rapid technological innovations and shifting global realities. These forces are gradually shaping both the policies and practices that guide the nation's approach to learning. In this discussion, attention is given to four areas that are expected to play a central role in determining the future direction of Nigerian education: Information and Communication Technology (ICT) and digital learning, Technical and Vocational Education and Training (TVET), the effects of globalization on education, and the growing role of Artificial Intelligence. While these trends create valuable opportunities for reform and innovation, they also bring about complex challenges that will require deliberate policy responses and consistent follow-through if they are to achieve meaningful impact.

The outbreak of COVID-19 marked a turning point for education in Nigeria. It pushed schools and universities to rely more heavily on digital technologies, making clear the gaps in both infrastructure and digital literacy (National Information Technology Development Agency, 2023). At the same time, the challenges of a fast-growing youth population and high unemployment have brought renewed attention to Technical and Vocational Education and Training (TVET) as a practical route to economic empowerment and long-term development (ILO, 2025). Nigeria's education sector is increasingly affected by global trends, and artificial intelligence is now appearing as a tool with the potential to reshape how teaching, learning, and administration take place.

In this chapter, the discussion looks at these trends using recent statistics, new policy initiatives, and the challenges that come with putting them into practice. The findings point in two directions: On one side, Nigeria has clear opportunities to reshape its education system for the realities of the 21st century. On the other, the country still faces barriers, especially when it comes to respecting cultural values and addressing local development needs while introducing reforms.

ICT and Digital Learning Policies: Policy Framework and Strategic Direction

When the Federal Ministry of Education came up with the National Digital Learning Policy (NDLP) in May 2023 (Nigerian Education News, 2025), it felt like someone finally said what many have been thinking for years. Walk into any Nigerian school and you will see the same tired scene: learners crammed into classrooms with peeling paint, textbooks older than some of the teachers, and educators doing their absolute best with almost nothing (World Bank, 2019). The ministry's new policy is not just another fancy document it is a way of saying "enough is enough" to a system that has been limping along for decades. The government is basically throwing in the towel on the old-school approach where students sit in rows, copy notes until their hands cramp, and regurgitate information they will completely forget the moment they leave the exam hall.

What is smart about this new policy is that Nigeria did not just start from scratch; it actually looked at what has already been tried before. Looking at the National ICT Policy from 2019; the ICT in Education Policy from the same year; even the broadband plan have been working since 2020 (Nigeria Education News, 2025). The NDLP takes lessons from all these earlier attempts and tries to build something that is impactful. They broke it down into five main areas that sound complicated but are pretty logical; Creating clear rules everyone can follow, building online platforms that do not crash every five minutes, creating educational content that reflects Nigerian realities instead of importing everything from abroad, making sure people actually have laptops and internet that work, and teaching everyone from principals to first-graders how to use this stuff properly. The whole idea is to build something strong enough that when the next crisis hits, learners can keep learning instead of losing entire academic years (WifiTalents, 2025).

The Reality Check: Why Nigeria's Digital Education Dreams Hit Real-World Roadblocks

National Information Technology Development Agency (NITDA) thought it would help out by launching its own digital literacy framework in 2023 because apparently one policy was not enough, at least two may be needed. The National Digital Literacy Framework sounds great on paper, and it is supposed to work hand-in-hand with the education ministry's plans. But here is where things get messy: all these fancy policies mean absolutely nothing if learners cannot even turn on a computer. The numbers from Wifi Talents' 2025 report are honestly depressing only 17 out of every 100 Nigerian schools have internet that actually works when you need it. And we are not talking about slow internet here; we are talking about schools in rural areas that do not even have electricity to plug in a single laptop. One cannot exactly have "digital transformation" when the lights do not work. It is like planning a swimming lesson in the middle of the Sahara Desert. The gap between what Nigeria wants to achieve and what's possible right

now is so wide.

The government's broadband plan from 2020 sounds impressive when one reads it; people want fiber optic cables snaking to within 5 kilometers of every university, half of all secondary schools, and a quarter of primary schools by 2025. That is this year, by the way. There are also promising internet speeds of 25Mbps in cities and 10Mbps in villages, with 90% of Nigerians able to get online for no more than 390 naira per gigabyte (ZibDo, 2025). Now, if one has ever tried to stream a video in Lagos traffic or attempted to download anything in a rural area, one would probably be laughing right now. These targets look great in PowerPoint presentations, but anyone who has lived through Nigeria's internet struggles knows the difference between what politicians promise and what actually happens. We are talking about a country where "network issues" is practically a national problem, and suddenly there is the need to connect nearly every school to high-speed internet at prices that will not break parents' budgets? It is either incredibly optimistic or someone hasn't been paying attention to how things have been working.

Getting Learners Actually Excited About Learning Online

Here is where things get interesting; the government figured out it could not just throw tablets at learners and expect miracles. They launched something called the eContent Partner Programme, which is basically a way of bribing content creators (in a good way) to make educational videos and interactive lessons that do not put learners to sleep which is working. The Nigeria Learning Passport think of it as Netflix but for school lessons, saw learners numbers explode in 2023. This is talking about jumping from around 125,000 learners to over 750,000. That is more than six times the growth, which is incredible when you consider how skeptical Nigerian parents usually are about letting their children spend more time on screens (UNICEF Nigeria, 2025; Vuorikari, et al, 2020).

But there is the thing that gives hope, the government is not just dumping random YouTube videos and calling it education. The Nigerian Educational Research and Development Council (NERDC), the Teachers Registration Council (TRCN), and the National Universities Commission (NUC) are all working together to make sure the content is good (Education profiles, 2025). It is like having your maths teacher, your principal, and your university lecturer all checking your homework before it goes online. They want to make sure what learners are learning online reflects Nigerian culture and experiences, not some foreign curriculum that talks about winter when half the country has never seen snow.

Technical and Vocational Education and Training (TVET) Policies: Policy Reforms and Enrollment Surge

Something incredible happened with Nigeria's technical schools in 2004 that nobody saw coming. The number of students trying to get into TVET programmes absolutely exploded from about 7,500 applicants in 2004 to nearly 30,000 in 2025 (Nigeria Education News, 2025). That is almost four times. Many learners are suddenly deciding they would rather learn how to fix generators or build websites instead of chasing after traditional university degrees. For a country that has always looked down on technical education as the 'backup plan,' this shift is honestly shocking. It seems like young Nigerians are finally waking up to what many of us have known for years sometimes learning a practical skill pays better than a fancy certificate that gets you nowhere (National Association of Local Training Funds, 2025, Nigeria Education News, 2025). The government finally stopped treating technical schools like second-class education. A major overhaul that positions vocational training as the real solution to Nigeria's job crisis, not just a backup plan for learners who "could not make it" to university, was launched in May, 2025, when nearly 30,000 young people are suddenly fighting to get into technical programs, Nigerians are finally realizing that learning to code, weld, or run a business might actually put food on the table better than another generic degree (Namkere & Ijeoma, 2025).

Curriculum Modernization and Industry Alignment

In recent development, the Nigerian government through the Federal Ministry of Education has started updating what technical colleges teach to match what employers actually need (Federal Ministry of Education, 2025). They are reviewing 26 different trade programs and adding 14 brand new subjects like car repairs, welding, electrical work, solar energy, and even cosmetology. It is finally realized that teaching outdated skills from the 1980s was not helping anyone get jobs in 2025 (Statista, 2025). Now learners can learn about renewable energy instead of just memorizing theory that has nothing to do with the real world. The timing could not be better, Nigeria desperately needs people who can fix things, build things, and start businesses that solve actual problems.

The new TVET program is putting real money where its pocket is; they are paying learners between 22,500 and 45,000 naira every month just for learning a trade, as long as learners are between 18 and 35. And here is the kicker: when the learners finish, they do not just hand them a certificate and wish them luck, they give them the tools and equipment to start their own business right away. For a government that is usually all talk and no action, this feels different. It is basically saying "we will pay you to learn, and then give you what you need to make money." It is probably the smartest thing Nigeria has done about youth unemployment in years instead of watching young people graduate into joblessness, skilled workers are being created, who can earn a living or

become their own bosses (Tamim, et al, 2011).

Gender Disparities and Inclusivity Challenges

The problem nobody wants to talk about while more students are flooding into technical schools, is, most of them are still males (Unicef & ITU, 2020), (world Bank, 2025). Last year's numbers show that out of every 10 students enrolled in TVET programs, only about 3 were women. We are talking 68% men versus 31% women, which is a significant gap. Even when you look across different institutions, female enrollment barely hits 36% (ZibDo, 2025). It is like we have solved one problem getting young people interested in learning practical skills but created another by basically telling half the population these opportunities are not really for them (Unicef Nigeria, 2025). Nigerian parents are still pushing their daughters toward "softer" careers while encouraging their sons to get their hands dirty with welding and electrical work. Until we fix this mindset, we are essentially wasting half our potential workforce.

Regional and International Collaboration

Nigeria is teaming up with other West African countries through ECOWAS to make sure technical certificates work across borders so if one learn welding in Lagos, one can get a job in Ghana too. It makes sense when it is considered that 1 in 4 young people across the region are unemployed. Instead of each country doing its own thing, they are trying to solve the youth job crisis together by sharing standards and recognizing each other's qualifications.

Globalization and Education in Nigeria: International Standards and Structural Alignment

Globalization pushed Nigeria to restructure its schools to look like everyone else's: 6 years of primary school, 3 years junior secondary, 3 years senior secondary, then 4 years of university. On paper, it sounds just like what you would find in developed countries. But here is the brutal reality: making our system look global does not mean it works globally. The numbers are honestly heartbreaking. Even before COVID hit, nearly half the world's learners could not read a simple story by age 10 and in poor countries like ours, that number jumped to 8 out of every 10 children. The pandemic made everything worse, pushing the global figure to 58%. While Nigeria's education structure might tick all the international boxes, our learners are still struggling with the basics. It is like building a beautiful house that looks exactly like the ones in rich neighborhoods but forgetting to install proper plumbing; it might look right from the outside, but it does not actually function when you need it to (Azevedo, 2020).

Quality Challenges and International Benchmarking

Nigeria's schools might look international on paper, but the results tell a different story. Our learners are still struggling with basic literacy and numeracy, and when it comes to critical thinking it gets even worse. It is like we spent all our energy making sure our education system looks like Harvard's but forgot to actually teach students how to think or solve problems.

Many stakeholders keep talking about making our universities "world-class" and "globally competitive," but honestly, most of our graduates still cannot hold their own against peers from other countries. We have copied the format, semesters, credit units, degree classifications, but missed the substance. It is not enough to change how we organize classes or write curriculum documents. The real issue is that our teachers need better training, our schools need actual resources, and the whole system needs to stop focusing on certificates and start focusing on whether students are actually learning anything useful.

International Collaboration and Mobility Challenges

Nigeria keeps signing partnerships with universities abroad and bringing in international organizations like UNESCO and UNICEF, which sounds great until you realize we are also hemorrhaging our best-educated people to other countries. For every exchange programme, or research collaboration we start, dozens of our brightest minds are packing their bags for Canada, the UK, or anywhere else that will actually pay them what they are worth.

The stakeholders know this is happening but the solutions are pretty weak. There are talks about "improving local quality" and "creating attractive career pathways," but then a fresh engineering graduate discovers they can earn in one month abroad what they would make in six months here. Even the Diaspora engagement strategies being mentioned, sometimes basically amount to asking successful Nigerians overseas to send money back home instead of fixing the reasons they left in the first place. All these international partnerships look impressive in reports, but they won't mean much if we keep training people for other countries' economies instead of our own.

Cultural Preservation and Local Content Integration

According to Tamim, et al,(2011), Nigeria is trying to have it both ways; where learners are learning coding and speaking English like global citizens, and on the other hand, the learners are not forgetting where they come from. So now, it is possible to find digital learning platforms teaching mathematics in Yoruba or Hausa, and schools trying to squeeze traditional proverbs into modern lesson plans. It is pretty smart when this is given consideration; why should learning about democracy mean forgetting the wisdom of our grandmother's generation? The tricky part is making this work without turning education into some confused mess. Learners are pushing to learn block chain

technology and traditional farming methods, global business skills alongside local crafts. It sounds nice in theory, but teachers are already overwhelmed trying to cover basic subjects. Meanwhile, education experts keep reminding the government that we should be spending 15-20% of our national budget on schools if we are serious about any of this. Right now, we are nowhere close to that number, which makes all these grand plans about preserving culture while going global feel a bit like wishful thinking (Nja, et al, 2023).

Artificial Intelligence and Education in Nigeria: National AI Strategy and Market Projections

Nigeria jumped on the Artificial Intelligence (AI) bandwagon in 2024 with their National Artificial Intelligence Strategy, complete with the usual grand promises about becoming a "global leader" in AI innovation (Joel et al 2025). With the purpose of preparing Nigerians for an AI-driven future, which is pretty ambitious for a country where many schools still do not have reliable electricity. But, to give credit where it is due, the nation is at least thinking ahead instead of waiting for other countries to figure everything out first.

The Centre for Artificial Intelligence and Robotics has been quietly working since 2020 on AI research, robotics, and drones. Then, gradually over the years, Nigeria launched its own large language model that can understand multiple Nigerian languages (Ludo, 2025). Think ChatGPT, but one that gets the Pidgin English and does not assume everyone speaks like they are from California. It is the kind of thing that could genuinely help Nigerian learners learn in their own languages instead of struggling with foreign accents and cultural references. Whether this will reach the average Nigerian classroom is another question entirely, but at least someone is trying to build AI that reflects how Nigerians actually talk (Sanusi, et al, 2024), (WifiTalents, 2015).

Educational Applications and Implementation Challenges

According Joel et al (2025), the World Bank actually tested AI tutoring with over 700 Nigerian students in 2024, and the results were pretty encouraging (World Bank, 2025). Learners were more engaged and learning better when they had AI helping them out. It is the first real proof we have that this could work in Nigerian classrooms, not just fancy schools in Silicon Valley. However, most Nigerian schools can barely keep the lights on, let alone run sophisticated AI programs. The government's own AI strategy admits what everyone already knows our schools do not have the infrastructure, teachers do not know how to use these tools, and there is no money to train them properly. So, while 759 learners in a controlled study might have done well with AI tutors, scaling that up to millions of Nigerian learners is a completely different challenge.

Professional Development and Capacity Building Initiatives

A free AI academy was launched by government in 2024 which was impressive until it was realized that it mainly targeted civil servants and older learners, not the primary and secondary school learners who need to grow up with this technology. What is interesting is that, Nigerian science teachers are excited about using AI in their classrooms; they are not the resistant, change-hating educators you might expect. But there is a huge problem: most of them have no clue on how to use AI tools effectively. Many studies like that of Oyelere, et al, (2022), found out that teachers want to integrate AI but feel completely unprepared to do it properly. So, we have enthusiastic educators and willing learners, but nobody is bridging the gap with proper training. It is like having a room full of people who want to drive but nobody knows how to operate the car. The AI Academy might help eventually, but right now it is missing the most important group-the teachers who are supposed to be using this stuff with the learners every day.

Ethical Considerations and Implementation Framework

Nigeria's AI education policies sound impressive when it centered on being "ethical" and "responsible" (NITDA, 2023), (Federal Ministry of Education,2023), but that is mostly because officials are panicking about learners using ChatGPT to cheat and worried about protecting learners' data from tech companies. There are lots of fancy written documents about transparency and fairness, but making this work in real classrooms is a different story entirely.

Most AI learning is still happening in random after-school programs or computer clubs, not in regular classes where it belongs. It is like treating AI as some optional hobby instead of a skill every Nigerian learner will need to survive in tomorrow's job market. Until they stop talking about "systematic integration" and put AI education in the main curriculum, these ethical frameworks are just expensive paperwork that won't help the millions of learners who need these skills (Joel et al 2025).

Integration Challenges and Future Directions: Convergence of Policy Initiatives

The policy initiatives examined in this chapter are increasingly convergent, creating synergistic opportunities for educational transformation. Digital learning platforms enhanced by AI capabilities can deliver personalized TVET programmes that meet global standards while addressing local skill needs. Similarly, AI-powered educational tools can facilitate the globalization of Nigerian education by enabling participation in international learning networks and collaborative platforms. The integration of these trends requires coordinated policy frameworks that address infrastructure development, capacity building, content creation, and quality assurance across multiple domains simultaneously. The Federal Ministry of Education's holistic approach to digital transformation, encompassing ICT infrastructure, TVET modernization, and AI

integration, demonstrates recognition of the synergistic relationships.

Sustainable Implementation Strategies

Nigeria has this annoying pattern where every new government throws out the previous administration's education plans to start fresh with its own "revolutionary" ideas. If we are going to fix our schools, somebody needs to commit to seeing these reforms through for at least a decade, not just until the next person gets into office. And let's be real about money, no one can run AI programs and digital classrooms on mere goodwill.

The smartest thing would be getting companies like recognized private individual philanthropists, banks, and telecom giants to invest in education since they will benefit from having skilled workers. But Nigeria's biggest weakness is always running to foreign donors when things get tough. Every time we start an education project, it is funded by the World Bank, UNESCO, or some European country. What happens when they get tired of helping us or decide to focus on another African country? We end up with half-finished programs and empty promises. Until Nigeria learns to fund and manage its own education system instead of constantly begging for help, all these fancy policies will just be expensive paperwork that nobody remembers in five years (National Association of Local Training funds, 2025).

Monitoring and Evaluation Framework Development

The digital learning policy of the Federal Ministry of Education at least mentions monitoring and evaluation (Federal Ministry of Education, 2023), which is more than what most government programs bother with, but saying you will track progress and doing it are two different things entirely. The idea of using data and AI to figure out what is working sounds great until it is realized that most Nigerian schools cannot even keep proper attendance records. How are we supposed to run sophisticated evaluation systems when teachers are still using chalk on broken blackboards? And here is the real problem; nobody really knows how to measure whether learners are getting better at "21st-century skills" or "AI literacy." We are making up metrics as we go along, throwing money at research that may or may not tell us anything useful.

Conclusion

All these education reforms sound amazing on paper, but the reality is sobering. We keep talking about digital transformation while 83% of Nigerian schools still cannot get reliable internet (Oyelere, et al, 2022). The one bright spot in technical education is where enrollment jumped 300% in just one year according to Daily Post Nigeria, (2025). Finally, young Nigerians are realizing that learning how to fix solar panels or code websites might actually pay their bills better than another generic degree. Adding subjects like renewable energy and digital skills shows someone's paying attention to

what employers need. But even here, we are still stuck with the same old problems mostly men are enrolling, and by the time learners graduate, half the curriculum might already be outdated because technology moves so fast. It is progress, sure, but it is the kind of slow, uneven progress that makes you wonder if we will ever really catch up to where we need to be.

The AI boom is supposed to be worth over billions of naira by the coming years, which sounds impressive until you remember that most Nigerian schools do not have working computers, let alone AI tutors. Sure, AI could revolutionize how learners learn, but it could also make things worse if only rich schools get access while poor schools are left further behind. We are talking about ethical AI and equitable access while millions of Nigerian children still learn under trees or in overcrowded classrooms without electricity.

Nigeria cannot keep trying to fix education one piece at a time building internet infrastructure this year, training teachers next year, creating digital content the year after. Everything needs to happen together, which means getting government agencies to actually coordinate instead of working against each other, convincing businesses to invest for the long term, and making sure international partners do not just disappear when the next crisis hits.

The clock is ticking because Nigeria has more young people than almost any other country (Sanusi, et al, 2024). That is either going to be our superpower or our biggest problem. If we can educate this massive youth population properly, we could become a global powerhouse. But if we keep fumbling around with half-implemented policies and broken systems, we will have millions of frustrated young people with no real skills and no decent job prospects. That is not a recipe for a stable country. The window for getting this right is closing fast, and all the fancy policy documents in the world won't matter if we cannot deliver actual results for actual learners in actual classrooms.

Nigeria needs to stop treating these education trends like separate projects and start seeing them as one big interconnected challenge. (No more launching digital learning this year, AI programs next year, and vocational training reforms the year after everything needs to work together or nothing will work at all). The numbers do not lie: we have millions of young people who need real skills, technology that could actually help if we use it right and international partnerships that could make a difference. But we also have the same old Nigerian problems: inconsistent funding, poor infrastructure, and the habit of abandoning good ideas when new politicians take office. The opportunity is massive, but so is the risk of wasting it. If Nigeria can follow through on these reforms for once, we could genuinely transform education. If we cannot, we will just have more expensive reports and disappointed learners.

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CHAPTER SEVEN

ATTITUDINAL DISPOSITIONS OF PARENTS AND TEACHERS TOWARDS LEARNERS WITH VISUAL IMPAIRMENT AND THEIR IMPACT ON CLASSROOM PRACTICE

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Introduction

Attitudes are made up of beliefs, feelings, and intentions that affect how people react to others and different situations. In educational settings, teachers' attitudes play a central role in shaping how learners with visual impairment are included or excluded (Ajuwon, Chitiyo, Onuigbo, Ahon, & Olayi, 2020). For instance, Ajuwon, Chitiyo, Onuigbo, Ahon and Olayi (2020) found that while many secondary school teachers in Nigeria express theoretical support for inclusion of blind or partially sighted students, variation in training, policy awareness, and confidence affect their readiness to implement inclusive practices. Thus, teacher attitudinal disposition is not simply about what is believed but also what is practised in the classroom.

Parental attitudes are also crucial. Abodunrin, Abodunrin, and Lawal (2022) investigated parental attitude and learning readiness among parents of visually impaired students in special schools in Ibadan, Oyo State. They found a significant positive relationship between parental attitude and educational outcomes: parents with more favourable attitudes and higher readiness had children who were more likely to engage and succeed. This indicates that parents' perceptions and expectations can impact involvement, resourcing, emotional support, and ultimately, learners' educational adjustment.

Another dimension involves the intersection of teacher attitude with assistive tech availability. In a study by Abodurin, Lawal, and Edim (2023), "Assistive Technology Devices and Teachers' Attitude as Correlates of School Adjustment of Secondary School Students with Visual Impairment in Oyo State, Nigeria," the authors discovered that both teacher attitude and access to assistive-technology devices significantly

predicted school adjustment among students. When teachers have positive dispositions and adequate technology, students with visual impairments showed better school adaptation academically, socially, emotionally. Abodurin, Lawal, & Edim (2023) thus provide empirical evidence that attitudes without enabling tools limit impact, and tools without supportive attitudes may underperform.

Further, broader structural and experiential factors shape attitudes. Odo, Onah, Ujoatuonu, Okafor, Chukwu, Nwifo, Karatu, and Mefoh (2021) studied primary school teachers' attitudes towards inclusive education in South-Eastern Nigeria and found that aspects like teacher experience (years in service) and personality traits (notably conscientiousness) are predictive of more positive attitudes. However, class sizes, workload, lack of inclusive education training, and insufficient resources remain barriers to translating attitude into action.

Moreover, awareness, usage, and knowledge gaps among stakeholders influence how attitudes translate into practice. For example, Abodurin, Lawal, & Edim (2023) highlight that even when assistive-technology devices are available, teachers may not be sufficiently trained to use them; similarly, parental attitude studies (Abodunrin, Abodunrin, & Lawal, 2022) suggest that many parents in special schools possess limited information about available support services, which can reduce their ability to advocate or collaborate effectively with educators.

Literature Review

Recent Nigerian scholarship has increasingly explored how attitudes from both teachers and parents affect the schooling and classroom experiences of learners with visual impairment. For example, Olayi, Opara, Ewa and Unimke (2024) conducted a study in basic schools in Owerri North Local Government Area, Imo State, which examined teachers' knowledge and the actual practice of accommodation strategies for pupils with visual impairment. Their findings revealed that a majority (61.1%) of the teachers surveyed were not aware of specific accommodation strategies, and that although some teachers attempted to adapt their practice, overall implementation was weak and inconsistent. This suggests a gap between attitudinal disposition (which may be positive in principle) and actual practice, due to limited awareness and capability.

Another set of studies examines how assistive technologies or alternate learning strategies interact with attitudes and influence learner outcomes. Komolafe (2020) studied inclusive secondary schools in Lagos State to see how audio and non-optical devices affect learning outcomes for students with visual impairment in Social Studies. He found that where assistive technology devices were available and used, learning outcomes in Social Studies improved significantly among visually impaired students. However, availability was uneven, and in many schools, the absence of these devices

limited teachers' capacity to adapt classroom practice to the needs of visually impaired learners. Thus, assistive technology acts as a mediator: positive teacher attitudes make more difference when accompanied by tools that facilitate inclusive instruction.

Parental attitudes also appear in recent empirical work, particularly in how parents' expectations, support, and involvement shape what happens inside the classroom, even if indirectly. Abodunrin, Abodunrin, and Lawal (2022) in Ibadan (Oyo State) showed that parental attitude correlates significantly with educational outcomes for students with visual impairment. Parents who expressed more positive attitudes and who were more "ready" for schooling (emotionally, financially, or practically) tended to have children who were more engaged and better adjusted in school. Notably, parent readiness included understanding of visual impairment, willingness to provide support, and interaction with the school. Thus, even in special schools, parents' dispositions matter for classroom practice to the extent that they enable or press for resources and supportive learning conditions.

Home-school collaboration is another factor linking attitudinal dispositions to classroom practice Olalowo, I., Olarogba, A., & Amosun, M. (2024), assessed how collaboration between the home (parents) and the school influences school adjustment among pupils with visual impairment. The investigation revealed that good collaboration (regular communication, shared expectations, supportive home environment) is significantly associated with better school adjustment. In practice, when parents and teachers communicate well and share responsibility, students with visual impairment are more likely to receive necessary accommodations, receive homework adapted to their needs, and have better psychological adjustment to school. Conversely, poor home school collaboration means that even if teachers are willing, support from home may be lacking, which constrains what can be done in classroom practice.

There is also evidence that teaching strategies themselves and the strategic choices teachers make are influenced by their attitudes towards inclusion. Egwim (2024), working in Imo State, compared student-centred learning strategies with conventional methods in teaching English Language to students with visual impairment. The study found that student-centred strategies yielded stronger performance; but importantly, teachers' willingness to shift methods was conditioned by their perceptions of students' abilities, their own training in special education approaches, and whether they believed inclusion was feasible in their regular teaching environment. Teachers who held more positive beliefs about visually impaired learners were more likely to use student-centred methods. Thus, attitude influences not merely what teachers say they believe, but what pedagogical practices they choose.

There are also studies that document the extent of visual impairment among students and what that implies for classroom demands. For example, Amiebenomo, Isong, Edosa and Woodhouse (2022) measured habitual visual acuity of over two thousand primary and secondary school students in Edo State and compared their vision to the visual acuity demands imposed by classroom materials and seating positions. They found that while a small percentage met criteria for visual impairment, many pupils did not meet visual demands of their classrooms (e.g., small text, board distance). This mismatch suggests that even with favourable attitudes and intentions, classroom practice may remain inaccessible because the physical demands exceed the students' visual abilities and classrooms are not designed with adequate support. Teachers' attitudinal dispositions in recognizing vision problems and adapting instruction matter, but are often undermined by lack of awareness or infrastructure.

A recurrent theme in Nigerian scholarship on inclusive education is the knowledge-practice gap among teachers. While many educators voice support for inclusive education and express positive attitudes toward learners with visual impairment, their classroom behaviours do not always reflect these sentiments. Olayi et al. (2024) report that several teachers in Oyo and Lagos States affirmed their willingness to include learners with visual impairment, yet failed to consistently apply differentiated strategies such as tactile graphics or audio-assisted lessons. Komolafe (2020) similarly observes that inadequate training in specific accommodation strategies like orientation and mobility support or adaptive science experiments limits teachers' ability to translate their attitudes into effective practice. These studies suggest that attitudes alone, though necessary, are insufficient without sustained professional development and institutional support.

The role of assistive resources has also been extensively highlighted. Komolafe (2020) underscores that uneven access to Braille textbooks, screen readers, and other assistive devices undermines teachers' efforts to practice inclusion. In schools where such tools are unavailable, teachers often revert to conventional methods that exclude learners with visual impairment, even when they personally value inclusivity. The lack of resources creates a structural barrier that good intentions alone cannot overcome, reinforcing the need for systematic investment in assistive technologies across Nigerian schools.

Parental dispositions function as powerful catalysts for inclusive classroom practice. Abodunrin, Abodunrin, and Lawal (2022), in their study on home-school collaboration in Ibadan, found that parents who hold high expectations for their children and actively engage with teachers often motivate schools to adopt more inclusive practices. When parents provide encouragement, participate in school activities, or advocate for accommodations, teachers respond with greater effort to adjust lesson plans and classroom activities. Conversely, indifferent or stigmatizing parental attitudes tend to discourage teachers from implementing inclusive strategies, leading to gaps in support

for learners with visual impairment.

Research also draws attention to strategic pedagogy and instructional methods as a critical area where attitudes intersect with practice. Egwim (2024) notes that teachers who believe in the academic potential of visually impaired learners are more inclined to adopt innovative, student-centred strategies such as cooperative learning, adapted reading materials, and tactile models. However, Egwim stresses that these innovations depend heavily on prior training, mentoring, and contextual feasibility. Teachers in under-resourced schools may be unable to apply what they know even when motivated, creating a disconnect between positive beliefs and instructional realities.

Finally, structural and environmental constraints remain significant obstacles. Amiebenomo et al. (2022) highlight how poor classroom design, inadequate lighting, lack of vision screening, and limited availability of inclusive learning materials continue to undermine inclusive practice. Even when teachers and parents demonstrate positive dispositions, these systemic issues ranging from crowded classrooms to inaccessible school facilities restrict the implementation of inclusive strategies. This underscores the argument that attitudinal change must be complemented by structural reforms if inclusive education for learners with visual impairment is to be fully realized in Nigeria.

Statement of the Problem

The education of learners with visual impairment requires not only specialized resources and teaching strategies but also the positive attitudes of key stakeholders, particularly teachers and parents. Attitudes, which comprise beliefs, feelings, and intentions, significantly influence behaviors in educational settings. While many teachers and parents express support for the education of learners with visual impairment, gaps often exist between their attitudes and actual classroom practices. Teachers who have positive attitudes toward these learners are expected to adopt inclusive instructional strategies, utilize appropriate teaching aids, and implement learner-centered approaches. However, inconsistencies in training, policy awareness, and access to resources often hinder the translation of positive attitudes into effective classroom practices.

Similarly, parents play a crucial role in supporting learning through encouragement, expectations, and collaboration with teachers. Positive parental attitudes can motivate learners and encourage teachers to adapt instructional methods. Yet, parental involvement varies widely, with some parents lacking awareness of available resources or understanding of their child's educational needs. This uneven engagement can negatively affect the quality of classroom practices, limiting opportunities for learners with visual impairment to achieve their full potential.

Despite the importance of teacher and parent attitudes, little is known about how these attitudes jointly influence classroom practices, the use of assistive resources, and the overall inclusion of learners with visual impairment. As a result, learners may be disadvantaged due to a mismatch between positive intentions and practical application, compounded by limited skills, inadequate resources, and inconsistent parental support. Understanding these dynamics is essential for developing strategies to promote effective inclusion and improve educational outcomes for learners with visual impairment.

Purpose of the study

The purpose of this study is to investigate how the attitudinal dispositions of parents and teachers toward learners with visual impairment influence inclusive classroom practices. Specifically, the purpose of the study is to:

1. examine the extent to which teachers' attitudes toward learners with visual impairment influence their choice of instructional strategies and classroom management techniques.
2. investigate how parents' expectations and support affect collaboration with teachers and the overall inclusion of visually impaired learners in classroom activities.
3. assess the availability and use of assistive resources.
4. determine whether teachers' and parents' attitudes contribute to the effective deployment of such resources.

Research Questions

1. To what extent do teachers' attitudes toward learners with visual impairment influence their choice of instructional strategies and classroom management techniques?
2. How do parents' expectations and support affect collaboration with teachers and the overall inclusion of visually impaired learners in classroom activities?
3. What assistive resources are available for learners with visual impairment, and to what extent are they used in the classroom?
4. Do teachers' and parents' attitudes contribute to the effective use of assistive resources for learners with visual impairment?

Methodology

The study adopted descriptive survey research design. The study population comprised 20 teachers of students with visual impairment in Durbar Grammar School, Oyo, Oyo State and 30 parents of the students with a total number of 50 participants. Questionnaire on Attitudinal Dispositions of Parents and Teachers towards Learners with Visual Impairment and Their Impact on Classroom Practice were designed by the researchers

and this was used for data collection. The instrument which has 20 items uses Strongly Agreed (SA), Agreed (A), Strongly Disagreed (SD) and Disagreed (D) scale for response.

Validity and Reliability of the Instruments

The face and content validity of the instrument was achieved through vetting by expert review. The construct validity of the instrument was achieved through the contribution of experts in the field of Education. The instrument was tested reliability by conducting a pilot test. The instrument was administered to 50 respondents (Teachers and Parents) who were part of the study. The scores obtained from the pilot test was computed using internal consistency reliability coefficient (Cronbach's Alpha). The Alpha reliability index of the instrument was, 0.752. This was considered high enough to make the questionnaire reliable for the study.

Data Analysis

Research Question 1, 2, 3 and 4 were analyzed using descriptive statistic of Percentage, Mean and Standard Deviation were used to answer the research question. Analysis of Covariance (ANCOVA) was used to analyze collected data for the hypothesis at 2.50 level of significance.

Procedure of Data Collection

The data collection procedure for this study followed a systematic process to ensure the accuracy and reliability of the information obtained. Initially, the researcher sought and obtained official permission from the authorities of Durbar Grammar School to conduct the study among the teachers of students with visual impairment and parents to the students. After receiving approval, the researcher personally visited the school to build rapport with the respondents, clearly explaining the purpose of the research and assuring them of confidentiality as well as the voluntary nature of their participation. Structured questionnaires were then administered by the teachers of Durbar Grammar School and the parents after obtaining the necessary permission and establishing rapport with them. Upon collection, the completed questionnaires were carefully checked for completeness and accuracy before being coded and entered into the Statistical Package for the Social Sciences (SPSS) for analysis. This systematic process ensured that the data collected were reliable, valid, and truly reflective of the respondents' opinions concerning the attitudinal dispositions of parents and teachers towards learners with visual impairment and their impact on classroom practice.

Results

Research Question 1: To what extent do teachers' attitudes toward learners with visual impairment influence their choice of instructional strategies and classroom management techniques?

S/N	Teachers' Attitudes and Instructional Strategies	SA (%)	A (%)	D (%)	SD (%)	Mean (\bar{X})	Std. Dev.	Remark
1	Teachers who hold positive attitudes toward learners with visual impairment are more likely to adopt inclusive instructional strategies.	23 (46%)	23 (46%)	2 (4%)	2 (4%)	12.5	12.12	Accepted
2	Teachers who believe in the abilities of visually impaired learners tend to use diversified instructional materials.	17 (34%)	21 (42%)	8 (16%)	4 (8%)	12.5	7.85	Rejected
3	A teacher's willingness to collaborate with specialists is shaped by their attitude toward visual impairment.	27 (54%)	22 (44%)	1 (2%)	0 (0%)	12.5	14.01	Accepted
4	Teachers' positive attitudes encourage the use of learner-centered instructional strategies that benefit visually impaired learners.	17 (34%)	29 (58%)	0 (0%)	4 (8%)	12.5	13.18	Accepted
5	Teachers' attitudes influence their use of instructional aids when teaching learners with visual impairment.	20 (40%)	26 (52%)	1 (2%)	3 (6%)	12.5	12.40	Accepted

The study investigated how teachers' attitudes toward learners with visual impairment influence their choice of instructional strategies and classroom management techniques. The findings, presented in Table 1, show varying levels of influence across different aspects of teaching. It was observed that 46% of teachers strongly agreed and 46% agreed that teachers who hold positive attitudes toward learners with visual impairment are more likely to adopt inclusive instructional strategies, giving a mean score of 12.5 and a standard deviation of 12.12. This indicates that positive teacher attitudes significantly support the adoption of inclusive strategies and was therefore accepted.

Regarding the belief in learners' abilities, 34% strongly agreed and 42% agreed that teachers who believe in the abilities of visually impaired learners tend to use diversified instructional materials. However, a notable proportion of teachers disagreed (16%) or strongly disagreed (8%), resulting in a mean of 12.5 and a lower standard deviation of 7.85. This suggests that while some teachers are motivated by their beliefs, overall, this item was rejected, indicating limited influence. Also, the willingness of teachers to collaborate with specialists was highly influenced by their attitudes, with 54% strongly agreeing and 44% agreeing that positive attitudes shape collaboration. The mean score of 12.5 and a standard deviation of 14.01 supports the view that attitude strongly affects collaborative practices, and this item was accepted.

Attitudes Toward Learners with Visual Impairment & Classroom Practice

Furthermore, 34% of teachers strongly agreed and 58% agreed that positive attitudes encourage the use of learner-centered instructional strategies that benefit visually impaired learners, with a mean of 12.5 and a standard deviation of 13.18, confirming that teacher attitude plays a critical role in adopting learner-focused approaches. This item was also accepted.

Lastly, teachers' attitudes were found to influence their use of instructional aids, with 40% strongly agreeing and 52% agreeing. The mean of 12.5 and a standard deviation of 12.40 reinforces the significance of attitude in determining the use of appropriate teaching aids, and this finding was accepted.

Research Question 2: How do parents' expectations and support affect collaboration with teachers and the overall inclusion of visually impaired learners in classroom activities?

S/N	Parents' Expectations and Inclusion	SA (%)	A (%)	D (%)	SD (%)	Mean (\bar{X})	ST.D	Remark
1	Collaboration between parents and teachers improves adaptations made for visually impaired learners.	28 (56%)	22 (44%)	0 (0%)	0 (0%)	12.5	14.64	Accepted
2	Lack of parental involvement negatively affects teachers' efforts to include visually impaired learners in classroom activities.	25 (50%)	13 (26%)	3 (6%)	9 (18%)	12.5	9.29	Rejected
3	Parents who attend school meetings contribute positively to the inclusion process.	29 (58%)	21 (42%)	0 (0%)	0 (0%)	12.5	14.80	Accepted
4	Parents who frequently communicate with teachers help strengthen inclusion practices.	14 (28%)	24 (48%)	5 (10%)	7 (14%)	12.5	8.58	Rejected
5	Parents with high expectations for their visually impaired children encourage teachers to engage more collaboratively.	23 (46%)	23 (46%)	2 (4%)	2 (4%)	12.5	12.21	Accepted

The study examined how parents' expectations and support influence collaboration with teachers and the overall inclusion of visually impaired learners in classroom activities. The findings, presented in Table 2, reveal varying levels of impact across different aspects of parental involvement. It was observed that 56% of respondents strongly agreed and 44% agreed that collaboration between parents and teachers improves adaptations made for visually impaired learners. With a mean of 12.5 and a standard deviation of 14.64, this finding demonstrates a strong positive influence of parent-teacher collaboration on inclusive practices and was therefore accepted.

However, regarding the negative effect of lack of parental involvement on teachers' efforts, 50% strongly agreed and 26% agreed, but 6% disagreed and 18% strongly disagreed, producing a mean of 12.5 and a standard deviation of 9.29. The mixed responses indicate that not all teachers perceive parental absence as a major barrier, leading this item to be rejected. Also, parents' attendance at school meetings was shown to positively contribute to inclusion, with 58% strongly agreeing and 42% agreeing. The high mean of 12.5 and standard deviation of 14.80 confirms that active participation in school meetings significantly supports inclusive practices, and this item was accepted.

The role of frequent communication with teachers, however, elicited more varied responses: 28% strongly agreed and 48% agreed, while 10% disagreed and 14% strongly disagreed, resulting in a mean of 12.5 and a standard deviation of 8.58. This variation suggests that regular communication, while helpful, is not consistently perceived as critical, and this item was rejected. Finally, parents with high expectations for their visually impaired children were found to encourage teachers to engage more collaboratively, with 46% strongly agreeing and 46% agreeing. The mean of 12.5 and standard deviation of 12.21 indicate a significant positive influence, and this finding was accepted.

Research Question 3: What assistive resources are available for learners with visual impairment, and to what extent are they used in the classroom?

S/N	Availability and Use of Assistive Resources	SA (%)	A (%)	D (%)	SD (%)	Mean (\bar{X})	Std. Dev.	Remark
1	The use of tactile diagrams and raised maps is recognized by teachers and parents.	19 (38%)	25 (50%)	1 (2%)	5 (10%)	12.5	11.36	Accepted
2	Accessible learning materials for visually impaired learners are available in the school library.	23 (46%)	27 (54%)	0 (0%)	0 (0%)	12.5	14.53	Accepted
3	Teachers and parents are aware of computer-based screen readers used by learners with visual impairment.	14 (28%)	31 (62%)	3 (6%)	2 (4%)	12.5	13.48	Accepted
4	Audio learning devices are known by teachers and parents to support learners with visual impairment.	20 (40%)	28 (56%)	0 (0%)	2 (4%)	12.5	13.70	Accepted
5	Both teachers and parents are informed about the Braille textbooks provided in the school.	17 (34%)	29 (58%)	2 (4%)	2 (4%)	12.5	13.08	Accepted

The study explored the types of assistive resources available for learners with visual impairment and the extent to which these resources are used in the classroom. The findings, summarized in Table 3, indicate a generally high level of awareness and use of various assistive tools among teachers and parents. It was observed that 38% of respondents strongly agreed and 50% agreed that tactile diagrams and raised maps are

recognized by teachers and parents. With a mean of 12.5 and a standard deviation of 11.36, this suggests that these resources are widely acknowledged and utilized, leading to the item being accepted.

Regarding accessible learning materials in the school library, 46% strongly agreed and 54% agreed that such resources are available for visually impaired learners. The mean score of 12.5 and standard deviation of 14.53 confirm strong awareness and utilization of these materials, resulting in acceptance of this item. Also, awareness of computer-based screen readers among teachers and parents was slightly lower, with 28% strongly agreeing and 62% agreeing, while 6% disagreed and 4% strongly disagreed. Despite the minor variation, the mean of 12.5 and standard deviation of 13.48 indicate that these digital tools are recognized and used in classroom settings, and this item was accepted.

Audio learning devices also showed high recognition, with 40% strongly agreeing and 56% agreeing that they support learners with visual impairment. A mean of 12.5 and standard deviation of 13.70 highlight their widespread use, leading to acceptance. Finally, regarding Braille textbooks, 34% strongly agreed and 58% agreed that teachers and parents are informed about their availability. The mean of 12.5 and standard deviation of 13.08 demonstrate that these essential resources are well-known and applied in the classroom, resulting in this item being accepted.

Research Question 4: Do teachers' and parents' attitudes contribute to the effective use of assistive resources for learners with visual impairment?

S/N	Influence of Teachers' and Parents' Attitudes on Assistive Resources	SA (%)	A (%)	D (%)	SD (%)	Mean (\bar{X})	Std. Dev.	Remark
1	Parents who value assistive devices support their children in using them consistently.	25 (50%)	17 (34%)	6 (12%)	2 (4%)	12.5	10.47	Accepted
2	Parents' positive attitudes motivate learners to make effective use of assistive resources.	24 (46%)	24 (48%)	0 (0%)	2 (4%)	12.5	13.30	Accepted
3	Teachers with limited interest in visual impairment avoid integrating assistive devices into teaching.	19 (38%)	21 (42%)	6 (12%)	4 (8%)	12.5	8.74	Rejected
4	Parents' involvement encourages teachers to utilize more assistive resources in the classroom.	18 (36%)	26 (52%)	2 (4%)	4 (8%)	12.5	9.94	Rejected
5	Both teacher and parent attitudes jointly determine how effectively assistive resources are applied to support visually impaired learners.	31 (62%)	16 (32%)	1 (2%)	2 (4%)	12.5	14.11	Accepted

The study examined how teachers' and parents' attitudes contribute to the effective use of assistive resources for learners with visual impairment. Table 4 presents the responses, highlighting the significant role of positive attitudes in promoting the consistent use of these resources. It was observed that 50% of respondents strongly agreed and 34% agreed that parents who value assistive devices support their children in using them consistently. With a mean of 12.5 and a standard deviation of 10.47, this indicates a strong positive influence of parental attitudes on the proper utilization of assistive resources, and the item was therefore accepted.

Similarly, 46% strongly agreed and 48% agreed that parents' positive attitudes motivate learners to make effective use of assistive resources. The mean of 12.5 and standard deviation of 13.30 reinforce the importance of parental encouragement, and this finding was accepted. However, regarding teachers with limited interest in visual impairment avoiding the integration of assistive devices, 38% strongly agreed and 42% agreed, while 12% disagreed and 8% strongly disagreed, resulting in a mean of 12.5 and a lower standard deviation of 8.74. This variation suggests that not all teachers' negative attitudes strongly hinder the use of assistive resources, leading this item to be rejected.

Similarly, parental involvement in encouraging teachers to utilize more assistive resources received mixed responses: 36% strongly agreed and 52% agreed, but 4% disagreed and 8% strongly disagreed, with a mean of 12.5 and a standard deviation of 9.94. This indicates that while parental involvement is helpful, it is not consistently influential across all settings, and the item was rejected. Finally, 62% strongly agreed and 32% agreed that both teacher and parent attitudes jointly determine how effectively assistive resources are applied to support visually impaired learners. The high mean of 12.5 and standard deviation of 14.11 highlight the combined impact of teachers' and parents' positive attitudes on the proper use of assistive resources, and this item was accepted.

Discussion of Findings

The study sought to examine the influence of teachers' and parents' attitudes on the instructional strategies, classroom management techniques, and the use of assistive resources for learners with visual impairment. The discussion of findings is presented according to the research questions. The findings revealed that teachers' positive attitudes toward learners with visual impairment significantly influence their instructional strategies and classroom management techniques. A majority of teachers agreed that holding positive attitudes encourages the adoption of inclusive instructional strategies, learner-centered approaches, collaboration with specialists, and the use of instructional aids. This suggests that teachers who recognize and value the abilities of visually impaired learners are more likely to create an enabling learning environment (Avramidis & Norwich, 2002). However, the study found that belief in learners' abilities did not consistently translate to the use of diversified instructional materials, indicating gaps in practice despite positive attitudes. This aligns with findings by Florian and Linklater (2010), who observed that teachers' attitudes alone are insufficient without practical skills and resources to support inclusive instruction.

Parents' involvement was found to positively influence collaboration with teachers and the inclusion of visually impaired learners in classroom activities. Collaboration and active parental participation, such as attending school meetings and holding high expectations for their children, were strongly associated with improved inclusive practices. These findings support the position of Hornby and Lafaele (2011), who emphasized that parental engagement enhances teachers' efforts and promotes effective inclusion. Conversely, frequent communication and parental involvement were not consistently perceived as critical, suggesting variability in how parents engage and the extent to which this translates to classroom inclusion. This implies that structured parent engagement programs could strengthen consistency in collaborative practices.

The study also explored the availability and classroom use of assistive resources for learners with visual impairment. The findings indicate a high level of awareness and utilization of tactile diagrams, raised maps, Braille textbooks, computer-based screen readers, and audio learning devices among teachers and parents. This confirms that assistive resources are an essential component of inclusive education, enhancing access to learning materials and supporting participation in classroom activities (Alnahdi, 2020). The consistent recognition and use of these resources highlight the importance of providing schools with appropriate tools to support learners with visual impairment.

Finally, the findings demonstrate that teachers' and parents' attitudes jointly influence the effective use of assistive resources. Positive parental attitudes, such as valuing assistive devices and motivating learners, were associated with consistent use of these resources. Similarly, teachers' willingness to integrate assistive tools was shaped by their attitudes. However, the study also identified cases where teachers' limited interest and inconsistent parental involvement negatively affected resource utilization. This underscores the importance of cultivating positive attitudes among both teachers and parents to ensure the effective application of assistive technologies, consistent with the findings of Eze (2018), who highlighted the critical role of stakeholders' attitudes in enhancing learning outcomes for learners with visual impairments.

Summary of Findings

This study examined the *Attitudinal Dispositions of Parents and Teachers Towards Learners with Visual Impairment and Their Impact on Classroom Practice*. The investigation focused on how teachers' and parents' attitudes influence instructional strategies, classroom management, collaboration, and the effective use of assistive resources to promote inclusive education for learners with visual impairment. The findings revealed that teachers' attitudes play a significant role in shaping classroom practices and determining the instructional strategies adopted for learners with visual impairment. A majority of the respondents agreed that teachers with positive and empathetic attitudes are more likely to adopt inclusive teaching methods, make necessary instructional adjustments, and manage classroom activities effectively to accommodate visually impaired learners. This underscores the fact that teachers' perceptions and dispositions greatly influence learners' academic engagement and success.

The study also found that parents' expectations and level of support have a considerable effect on collaboration with teachers and the inclusion of visually impaired learners in classroom activities. When parents show interest, maintain realistic expectations, and work hand in hand with teachers, it fosters better communication and shared responsibility. Such collaboration enhances the inclusion and participation of learners with visual impairment in academic and social aspects of schooling.

Furthermore, the findings indicated that the combined attitudes of teachers and parents significantly determine the availability and effective use of assistive resources for visually impaired learners. Respondents affirmed that when both teachers and parents possess positive attitudes toward assistive technology, they are more likely to advocate for, provide, and utilize educational aids such as Braille materials, talking devices, and screen readers. This results in improved accessibility, independence, and learning outcomes for learners with visual impairment.

Overall, the study established that both teachers' and parents' attitudinal dispositions have profound implications for the academic and social inclusion of learners with visual impairment. Positive attitudes enhance effective teaching, promote collaboration, and ensure the provision and utilization of assistive resources, while negative attitudes hinder inclusion and limit learning opportunities. Therefore, the success of inclusive education for visually impaired learners largely depends on the commitment, empathy, and collaborative efforts of teachers and parents.

Conclusion

This study on *Attitudinal Dispositions of Parents and Teachers Towards Learners with Visual Impairment and Their Impact on Classroom Practice* concluded that the attitudes of both teachers and parents play a crucial role in determining the quality of education and inclusion experienced by learners with visual impairment. Findings revealed that teachers' positive attitudes influence the selection of appropriate instructional strategies, classroom management techniques, and the creation of a supportive learning environment. When teachers demonstrate empathy, patience, and commitment, learners with visual impairment are better motivated to participate actively and achieve academic success.

Similarly, the study concluded that parents' expectations and level of support significantly affect their collaboration with teachers and the overall inclusion of visually impaired learners in classroom activities. Parents who show consistent interest in their children's education and maintain open communication with teachers contribute to a more inclusive and responsive educational process. Their involvement fosters mutual understanding, promotes better adaptation of instructional methods, and enhances learners' confidence and participation. Moreover, the research established that both teachers' and parents' attitudes greatly determine the availability and effective utilization of assistive resources for learners with visual impairment. Supportive attitudes encourage the acquisition, maintenance, and proper use of assistive technologies such as Braille machines, talking calculators, and screen readers, which are essential for effective learning and independence.

Recommendations

Based on the findings of this study the following recommendations are made:

- **Teachers should undergo regular training on inclusive education practices:** Workshops and seminars should be organized by educational authorities to enhance teachers' understanding of visual impairment and equip them with effective instructional and classroom management strategies. Such training will help teachers develop positive attitudes and confidence in handling learners with visual impairment, thereby improving teaching outcomes.
- **Government and school administrators should promote attitudinal change programs:** Awareness campaigns and sensitization programs should be carried out to change negative perceptions about learners with visual impairment. These programs should emphasize equality, inclusion, and the potential of visually impaired learners to achieve academic excellence when given the right support.
- **Parents should be actively involved in the educational process of their children:** Parents of learners with visual impairment should maintain close communication with teachers, participate in school activities, and collaborate in developing learning plans. Their encouragement and realistic expectations can motivate learners and strengthen inclusive classroom practices.
- **Provision and maintenance of assistive learning resources should be prioritized:** Both teachers and parents should advocate for the provision of assistive devices such as Braille materials, talking books, and screen readers. Schools and government agencies should ensure that these resources are made available, maintained, and effectively utilized to enhance accessibility and learning independence for visually impaired learners.
- **Collaborative partnerships between schools and the community should be encouraged:** Schools should work closely with parents, community organizations, and disability advocacy groups to promote inclusion. Such partnerships can support resource mobilization, training opportunities, and a shared commitment to improving the education of learners with visual impairment.

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CHAPTER EIGHT

ACHIEVING THE GOALS OF THE UNIVERSAL BASIC EDUCATION PROGRAMME THROUGH INTERNAL QUALITY ASSURANCE IN SCHOOLS

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Introduction

No nation can develop when its citizens are uneducated. This explains the wisdom behind the global emphasis on inclusive and quality education. Quality Assurance in education is a key to a successful national development as education is widely recognized as the major instrument and bedrock for enhancing socio-economic, political and cultural development of a nation. Quality in education is required to produce independent people who can take part in society through creativity, innovation and analyzing thinking which may help to make the society strong and active (Alzhrani, Alotibie & Abdul,aziz, 2016).

The UBE Act aims to ensure that all citizens are educated and quality is maintained at the basic education level through providing assistance to states, establishment of quality assurance framework and emphasizing the acquisition of literacy, numeracy and life skills. Stakeholders at all levels of government are saddled with the responsibility of ensuring the successful achievement of the UBE programme. Parents also are obligated by the Act to ensure that their children and wards attend basic education. UNESCO (2024) asserts that improving the quality of education provided in schools is imperative. This signifies that no matter how good the UBE Act is prepared for the provision of basic education in Nigeria, if issues bothering on quality assurance in the provision of such education are neglected, the policy and objectives meant to be achieved will remain a dream.

This paper, therefore, discusses issue bothering on UBE policies and internal quality assurance in schools. The paper highlighted some of the provisions of UBE policies with reference to some sections and the UBE objectives, quality assurance and its role in the realization of UBE policies especially the role of school administrators in internal quality assurance. School administrators, teachers, other staff, parent/learners and resources

were recognized as the determinants for the achievement of internal quality assurance in schools. Measures for effective internal quality assurance such as proper delegation of duties, regular monitoring, supervision and evaluation were also discussed in relations to their role in strengthening internal quality assurance in schools. The paper also recommended that tasks be properly assigned and that consistent monitoring, supervision and evaluation be carried out, as these are essential for achieving effective internal quality assurance in UBE schools.

The UBE Act and Policies on Basic Education

The world through Sustainable Development Goals (SDGs) in goal four (4) seeks to ensure inclusive and quality education. Nigeria, a signatory to the SDGs, develops initiatives to achieve this. Section 18 (1) (3) of the Nigerian constitution of 1999 States that: “Government shall direct its policy towards ensuring that there are equal and adequate educational opportunities at all levels”. The 2003 Child's Right Act in Nigeria; Section 11 state that; every child is entitled to respect for the dignity of his person and that no child shall be subjected to physical, mental or emotional injury, abuse, neglect or maltreatment including sexual abuse. Similarly, section 15 of the Act stated the right of the child to free, compulsory and universal basic education. The UBE Act 2004 in Section 2 (1) further states that “Every government in Nigeria shall provide free, compulsory universal basic education for every child of Primary and Junior secondary school age”. These policies reiterate the necessity for every child to have access to free, compulsory and quality education irrespective of the challenges or situation.

The UBE Act 2004 has taken into consideration all challenges that may likely hinder the achievement of its objectives. In Section 2 (2) the Act states that every parent shall ensure that his child or ward attends and complete his Primary and Junior Secondary Education; by sending that child to school. Section 2 (4) further prescribes the penalty for any parent who contravenes Section 2 (2) to include on first conviction to be reprimanded, second conviction a fine of two thousand naira or imprisonment for one month or both and on further convictions; to be subjected to a fine of five thousand and imprisonment for a term of two months or both. These penalties signifies government commitment in ensuring that each child receives basic education irrespective of the belief, customs or traditions that his parents might have hold which may hamper on his educational achievements. Section 3 (1 & 2) further clarifies that the services provided in Primary and Junior Secondary Schools shall be free of charge and that any person who receives or obtains any fee contrary to the provisions of Subsection (1) of the Act is liable to conviction to a fine not exceeding ten thousand naira or imprisonment for a term of three months or both. The Act further clarifies that no authority or individual should collect any fee either inside or outside the school in respect of basic education.

School administrations have no right to prescribe or collect any fees for this purpose and whoever does that will be penalized as prescribed in the Act.

The Federal Ministry of Education (FME) (nd.) in section 2 (1) of the UBE Act 2004, states that every government in Nigeria shall provide free, compulsory and universal basic education for every child of Primary and Junior Secondary School age. Based on this, the following objectives were outlined for the programme:

1. Develop in the entire citizenry a strong consciousness for education and a strong commitment to its vigorous promotion;
2. Provide free, universal basic education for every Nigerian child of school going age;
3. Reduce drastically the incidence of drop-out rate from the formal school system (through improved relevance, quality and efficiency)
4. Cater for the learning needs of young persons who, for one reason or another, have had to interrupt their schooling, through appropriate forms of complementary approaches to the provision and promotion of basic education;
5. Ensure the acquisition of appropriate levels of literacy, numeracy, manipulative, communicative and life skills, as well as the ethical, moral and civic values needed for laying a solid foundation for lifelong learning.

UBEC, according to the UBE Act 2024, is charged with the responsibility to “prescribe the minimum standard for basic education throughout Nigeria in line with the national policy on education and the directive of the national council on education and ensure the effective monitoring of the standards and to ensure that the basic national curricula and syllabi and other necessary instructional materials are in use in early childhood care and development centers, Primary and Junior Secondary Schools in Nigeria.”

Theoretical Framework

The discussions in this paper are anchored on the System Theory which was propounded by Ludwig Von Bertalanffy in 1933, later adapted by Robert Owens in 1981. General System Theory sees the universe as composed completely of living system which connects works together or evolves over time. The major purpose of general system theory is to develop unifying principles by their integration. Since everything is a system, these include all groupings of beings including relationships, groups, organizations or state (Connors, nd). A system view is based on the fact that essential quality of a part goes with its relationship to the whole part. The system and its parts should be designed on the perspective of the whole system and in relation to its environment.

This theory fits into this discourse because UBE is a system and has a commission, boards and schools which have inputs such as finance, staff and students, personnel,

physical and material resources. Its Processes include curriculum and instruction, teaching and learning, and administration processes. Outputs include knowledge, skills or competences acquired by the students. The internal quality assurance in schools therefore is necessary for the achievement of UBE Act policies and objectives; this is because if the schools fail in implementing the responsibilities vested on them especially that of teaching and learning, the whole programme will be affected negatively. Hence ensuring quality assurance in schools by school administrators is a prerequisite for a successful UBE programme in Nigeria.

Quality Assurance

Quality, according to Fabunmi (2020), refers to “meeting the set or desired objectives in terms of content, process and output”. Olabanji and Abayomi (2013) opined that Quality can be defined as “fitness for purpose”. It encompasses the concept of meeting standards upon which agreement is reached. Such standards may be defined by law, an institution, a coordinating body or a professional society. Quality in education as seen by Owuor (2012) refers to the “character of the elements of input, process and output of the education system that provides services that completely satisfy both internal and external stakeholders by meeting their implicit and explicit expectations”. Quality is therefore all about ensuring that the right things are done and procedures are rightly followed in the achievement of the institutions goals and objectives.

Luckett (2006) define quality assurance as “a systematic internal and external management procedures and mechanisms by which an institution assures its stakeholders of the quality of its systems, processes, products and outcomes of its ability to manage the maintenance and enhancement of quality.” Oduma (2013) is of the view that quality assurance in education involves many functions and activities such as teaching, research, staffing, academic environment, facilities and equipment and the quality of education delivery necessary to make teaching and learning effective and efficient. Machunu and Kisanga (2014) defines quality assurance as the means by which an institution can guarantee that the standards and quality of its educational provisions are being maintained and/or enhanced; and as the measures taken by an institution to satisfy it and demonstrate to its clients that it has constant capacity to keep its promise to deliver goods and services of the desired standard. UBEC cited in Awodun and Boris (2020) defines quality assurance in basic education as an all-encompassing concept which includes all processes, policies and actions through which the quality of basic education is developed, improved and maintained.

Internal Quality Assurance

Internal Quality Assurance as defined by Kawday (2019) is ‘a self-regulated mechanism by the institution with an aim of continuous improvement of quality and acquiring

academic excellence which centered on the quest for excellence in curriculum aspect, teaching/learning and evaluation, research innovation and extension, infrastructure and learning resources, student support and progression, governance, leadership and management and institutional values and best practices'. Internal quality assurance according to Dill (2007) is those policies and practices through which the institutions themselves monitor the quality of their education delivery. In essence therefore, internal quality assurance covers the mechanisms put in place by the school administrators to ensure that UBE objectives are achieved and its policies are translated in to reality.

School administrators are responsible for the management of both human and material resources of the school so as to ensure that internal quality assurance is achieved. School Administrators ensures that duties and responsibilities vested on them are carried out effectively so that when all the activities of UBE are coordinated, the policy's objective will not have any loophole. Since essential quality of a part goes with its own relationship with the entire system, school administrators are responsible for ensuring that internal quality assurance of the UBE schools are well guarded through the following:

- a. Effective execution of curriculum programme
- b. Proper delegation of duties to staff based on specialization and competence.
- c. Proper monitoring and supervision of UBE programmes.
- d. Evaluation of the UBE programme.
- e. Raising Teacher's morale through motivation and care for their welfare.
- f. Taking care of Student's learning activities and welfare appropriately.
- g. Creating positive relationship with parents, community and other educational institutions.

Determinants of Internal Quality Assurance in Schools

The determinants of internal quality assurance in schools include administrators, teachers, non-teaching staff, parents/learners and resources both human and material.

School Administrators: can bring significant change to schools and achieve internal quality assurance in the following ways:

- **Determination:** enables the administrator to continue to struggle towards the achievement of the schools goals. No matter the challenges faced, administrator should stand firm until success is achieved.
- **Participative leadership:** involving all stakeholders both within and outside the school in running the affairs of the school.
- **Leadership by example:** guard the goals and objectives of the school with dedication and hard work for the development of the institution.

- **Effective school/community relationship:** should be encouraged for a smooth running of a school.

Teachers: Teachers are the heart of any educational institution. They facilitate personal and professional development of individuals and groups through teaching and maintenance of discipline. When there are teachers of good quality and quantity, who are dedicated and willing to work effectively, internal quality assurance can be achieved.

Non-teaching staff: The non-teaching staff include the secretaries, bursars, security personnel, typists, cleaners and others whose presence and services ensures the smooth running of the schools goals and objectives. When these staff handle their duties effectively, the security, cleanliness and other matters related to the school will be handled properly and this will impact directly on the achievement of internal quality assurance.

Parents/Learners: when the parents are willing to cooperate with the school and unite with the school to show the learners the importance of education, the learners will see meaning in it and will become interested in school. This in turn will lead to more dedication and willingness to learn; hence the achievement of internal quality assurance through punctuality and doing of assigned tasks by the learners.

Resources: school resources either human or material if not adequate will mar the achievement of UBE objectives and policy realization. Internal quality assurance depends to a large extent on the adequacy of both human and material resources which the school administrator requires to ensure the effectiveness of teaching and learning.

Measures for Internal Quality Assurance in Schools

Delegation of Duties: Jackson in Aceke, Muola and Peter (2018), sees delegation as the achievement of task through others. Delegation of duties gives room for division of labour, specialization and effectiveness in handling responsibilities. It gives clear demarcation between individuals work and further creates a sense of responsibility in handling ones tasks; because a work for everybody is no one's work. School Administrators delegates the task of teaching, learning and administrative responsibilities to teachers with the hope that such tasks will be carried out effectively. Such tasks are assigned while taking in to cognizance areas of specialization. Aceke, Muola and Peter (2018) in their study found out that training is necessary to achieve the objectives of delegations and that attitude, incentives and workload affect delegation of duties. In essence therefore, delegation of duties determines who is responsible for a particular task. The responsibility that will make the individual to do it well and equally allows the school administrator to hold someone responsible for a task not done. Due to this accountability, delegation of tasks allows for internal quality assurance enhancement in UBE schools.

Monitoring: According to Okorie and Okai (2024), “monitoring is the systematic process of collecting and analyzing data at intervals about an ongoing projects and using some information to track programmes progress towards reaching objectives within the school system”. School administrators through monitoring can track progress, identify deviations from the actual plan, take proactive measures to address the situation and make informed decisions for better educational outcomes. Monitoring is a consistent activity done by the school administrators with the sole purpose of ensuring that things are done effectively for the achievement of educational objectives.

Monitoring needs certain qualities in school administrators to be carried out effectively. Nwangwa and Omotere (2013) in their study found out that quality assurance departments does not have much problem in monitoring curriculum implementation due to the fact that school administrators have management qualifications and skill. In essence therefore, the management qualifications and skills of a school administrator is a gateway to proper monitoring which in turn will enhance internal quality assurance in UBE schools.

Supervision: School administrators through supervision oversee school activities. Staff performance, policy implementation and educational quality are guided through supervision. Umeozor (2021) Opined that “supervision is the act or process of watching, examining, evaluating and directing the performance of a task or the work of a person or a group of persons in an organization” school administrators are therefore saddled with the responsibility of keeping constant watch on the performance of their staff so as to ensure that work is done effectively and internal quality assurance is enhanced in the schools. Any deviation from the expectations of the staff can easily be determined through supervision and then proactive measure can be taken to address the situation.

Evaluation: school administrators use evaluation to identify strengths and weaknesses so as to create room for improvement. Evaluation enables the identification of areas of strength thereby laying more emphasis on them and equally areas of weaknesses so that measures are taken for improvement. Through evaluation programmes; schools can check and re-check their activities to find out the progress made and the problems encountered. The problems can then be addressed to avoid deviation from the plan. Paying attention to details through evaluation gives room for constant improvement of internal quality assurance in UBE Schools.

Hindrances to the Actualization of the Universal Basic Education Goals

Poor Learning Facilities and Equipment - In 1997, a former Minister of Education in Nigeria, while on a nationwide schools tour admitted that school infrastructural facilities, classrooms, laboratories, workshops, sporting facilities, equipment, libraries were in a pathetic state of decay (Centre for Public Impact, 2017). The situation,

unfortunately, has not changed till date. Such situation can hinder the successful achievement of internal quality assurance.

Poor Budgetary Allocations - Nigeria in 2024 allocated 6.39% of its budget to education which falls below UNESCO'S recommendation of 15%. Many children are still out of school. According to the United Nations Children's Fund (UNICEF) approximation, there are about 18.3 million (10.2 million children of primary school age and 8.1 children of secondary school age) out of school children in Nigeria as at 2024 and this is the highest number globally (UNICEF, 2024). In essence, budget allocation to education in Nigeria is still a matter of concern coupled with the fact that Nigeria has the highest number of out of school children globally. This has direct impact on UBE and its policies as these children are yet to be enrolled in school while the budget for education is not enough to adequately provide for the children already school. The completion rate of primary and secondary schools levels is not encouraging as belief, customs or traditions of parents and guardians sometimes prevent a child from attending school or led the children to drop out of school in high number in either level. Table 1 gives an insight on this issue.

Table 1: Completion Rate of Primary and Secondary Schools in Nigeria

INDICATOR	NIGERIA (RECENT YEAR)
EDUCATIONAL OUTCOMES	
Primary completion rate, Female	51
Primary completion rate, Male	59
Secondary completion rate, Female	36
Secondary completion rate, Male	42

Source: UNESCO, 2024

Table 1 indicates that only 51% of females enrolled in primary schools in Nigeria completes their education while there are only 59% of male that completes education at that level. For secondary education, only 36% female and 42% of male complete their education at that level. This is so alarming because the completion rate is not encouraging coupled with the fact that the country is still battling with the problem of out of school children. These have direct impact on the achievement of UBE policies and objectives.

Quality assurance must be taken with all seriousness as it is the gateway to ensure learning and equally help in keeping the learners in school. UNESCO, (2024) asserts that "Schooling does not imply learning but lack of learning increases the likelihood of dropping out of school". According to UNICEF (2024), 73% of children aged 7-14 years struggles to understand simple sentences and 75% cannot solve basic Maths problems. This ponders directly on quality assurance especially internal quality assurance through which the school administrator can delegate duties, monitor, supervises and evaluate schools educational programmes for the realization of educational goals and policies.

Recommendations

Based on the issues discussed in this paper, the following are recommended:

1. School administrators should be more determined in ensuring that staff members carry out their duties effectively.
2. Delegation of duties should be based on specialization, capacity and competence so as to obtain a good result.
3. Monitoring and supervision should constantly be done in schools so that no work will be left undone.
4. Evaluation should be used to check for strength and weaknesses so that improvement can be made in schools.

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CHAPTER NINE

AN ASSESSMENT OF MAJOR ROLES AND CHALLENGES OF EFFECTIVE SCHOOL INSTRUCTIONAL SUPERVISION IN PUBLIC SECONDARY SCHOOLS IN KWALI AREA COUNCIL, FEDERAL CAPITAL TERRITORY (FCT), ABUJA, NIGERIA

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Introduction

The ability of school heads and principals to implement school policies through effective and supportive supervision is vital to the productivity and the overall success of the teaching and learning process. Supervision is an administrative process through which the leader ensures that his subordinates are all contributing towards effective learning process. According to Afe (2014) supervision helps to improve the effectiveness of teachers, harness his contribution maximally to the attainment of system goals. Supervision is the process of enhancing and improving effective teaching and learning in schools. Jackson (2016) defined supervision as an interaction process in which an organization's goals and values are communicated and interpreted to workers, guided and supported to actualize these goals.

Supervision assists teachers to understand their responsibilities, improve their performance and organize resources to achieve organizational goals of performance and productivity. Allen (2015) stated that supervision attempts to look into the organization of learning programmes, the grouping of pupils, method of evaluating, reporting and determining pupils progress, the content of the curriculum, the teaching methods, the philosophy and practicing of discipline, the time schedule, place and procedure of staff meetings, procedures used in parents conference, the study and use of the community resources. All these are evaluated and thoroughly discussed in the attempt to improve the learning and growing of the students. Ogunsaju(2019) viewed supervision as the essential practice of monitoring the performance of school staff noting their merits and demerits thereby increasing the standard of schools and achieving educational goals. Effective supervision demands that the supervisor should not only be a content expert, but also accepts mentorship responsibility. Unfortunately, poor supervision has enormous impact on the quality and cost for both the individual staff as well as the organization (Peretomode 2020). Igbineweka and Mani 2015).viewed supervision as a process of bringing about improvement in instruction by working with people who are working with students. Ejeh (2016) defined supervision as the process of overseeing

what goes in the school and integrating them for a meaningful purpose. To improve instruction within the classroom, educational supervisors have to supervise teachers and students. Therefore, supervision is an interaction between at least two persons for the improvement of an activity. It is seen as a formative, supportive and developmental process designed to enhance the process of guiding, encouraging, directing and motivating workers to enhance their output.

The purpose of instructional supervision in the school system according to Allen (2015) are: to develop educational goals; to control and coordinate educational activities; to motivate teachers and other staff; to solve problems in educational organizations to develop teaching professionalism; and to evaluate or assess educational outcomes. Instructional supervision is needed to ensure that each individual teacher within the school system is performing the tasks for which he/she is scheduled and to enhance the effectiveness of teachers so that they could contribute meaningfully to the achievement of the educational goals. It could be summarized that, the purpose of instructional supervision is to improve the teaching and learning process for the benefit of the student, teacher and the society at larger. The key roles of effective school supervision include: teacher professional development; instructional improvement; ensuring quality and standards; resource management; creating a positive environment; feedback and support; and fostering collaboration (Iyejare, 2023). Effective school supervision is vital for quality education by supporting teacher development, improving instruction, ensuring standards are met; and fostering a positive learning environment. It involves a collaborative guiding approach from supervisors who monitor performance, provide feedback, offer resources and create an environment where teachers, staff and students can work together to attain educational goals as well as enhance quality service delivery. Effective instructional school supervision improves outcomes, efficiency, accountability and alignment with goals (Jakson, 2016). The importance of instructional supervision in the school cannot be overemphasized, thus, it consists of: knowledge of the work, knowledge of responsibilities; the skill to improve methods.

Secondary education system is facing several challenges prominent among them is the operation of those schools below standard, thereby lowering the quality of education in Nigeria. The way out of this situation would have been through intermittent supervision of the schools by the government, but Nigerian private schools receive little to zero supervision. Iyejare (2023) outlined the following challenges of school supervision: inaccessibility of schools; large number of unregistered schools; insufficient number of supervisors; poor funding of education; bribery and corruption; untrained supervisors; lack of inspection equipment; unsupportive principal and teachers; poor implementation of supervision reports; and absence of effective follow-up. Insufficient funding; inadequate staffing; and lack of facilities are some of factors hindering effective school supervision. Similarly, Ejeh (2016), and Peretomode (2020) pointed the following challenges of school supervision: insufficient funding; lack of trained personnel;

inadequate infrastructure; resistance from school staff; lack of proper equipment; large number of classes to supervise; corruption; and administrative hurdles that hinders effective evaluation and improvement. Supervision should focus on professional growth, encouraging teachers to innovate and improve their teaching methods. For the goals of education to achieve supervision of instruction is very crucial. Supervision of instruction is tailored towards improvement of total teaching and learning processes. Afianmagbon(2014) viewed supervision of instruction as a process of guiding, directing and helping the teacher in the improvement of instructional process. Nwaogu(2016) supported that, supervision of instruction help to assess the “tone” of the school and identify some of its most urgent needs. This implies that, supervision of instruction is a service rendered to teachers which is tailored towards controlling the quality of class instruction.

The quest for quality is more rewarding and less costly than the fight for overcoming failure and wastage. If supervision of instruction is given much attention in Nigerian education system it will compete itself with developed countries. Supervisory constraints like: lack of motivation of supervisory staff; resistance to change and innovation; lack of cooperation among supervisors and teachers; lack of funds; and communication in secondary schools is below standard. This study was therefore designed to examine the major roles and challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja, Nigeria.

Purpose of the Study

Specifically the objectives of the study are:

1. To identify the major roles of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja, Nigeria.
2. To identify the challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja, Nigeria.

Research Questions

1. The following were the research questions raised to guide the conduct of the study:
2. What are the major roles of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja, Nigeria?
3. What are the challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja, Nigeria?

Methodology

Descriptive survey research design was adopted for this study to analyze the assessment of major roles and challenges of effective school instructional supervision in public

secondary schools in Kwali Area Council, FCT, Abuja, Nigeria. The target population for this study consisted of 128 which included schools 16 principals, 32 vice principals and 80 heads of departments from 16 public secondary schools (junior and senior) in Kwali Area Council, FCT, Abuja. A sample of 64 respondents comprising 8 principals, 16 vice principals (academic and administration) and 40 heads of departments and the schools were sampled from 8 public secondary schools (4 from junior and 4 from senior) through a random sampling technique. The instrument used for data collection was the researcher's self-designed questionnaire titled "Roles and Challenges of Effective School Instructional Supervision Questionnaire (RCESISQ)" The questionnaire was divided into three sections. Section A sought information from personal data of the respondents. Section B and C contain 7 and 10 items seeking principals, vice principals and heads of department responses on the major roles and challenges of effective school instructional supervision respectively.. Section B and C elicited responses on option of 'Agreed', 'Disagreed' and 'Undecided'. The instrument was vetted and validated by experts in Educational Management, Measurement and Evaluation. The instrument was pilot-tested to 2 principals, 4 vice principals and 10 heads of departments drawn from 2 public secondary schools (one junior and one senior) from Gwagwalada Area Council, FCT, Abuja, Nigeria that was not part of the study and a reliability coefficient index of 0.67 was obtained using chrombach's alpha statistics. The researcher personally administered the questionnaire to the sampled schools. Frequency and percentage were used to analyzed the research questions.

Results of Findings

Research Question One: What are the major roles of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja, Nigeria?

Table 1: Major roles of Effective School Instructional Supervision in Public Secondary Schools in Kwali Area Council, FCT, Abuja,

S/No	Items	Agree		Disagree		Undecided		Total	
		F	%	F	%	F	%		
•	Promoting teacher professional development.	45	70.3	19	29.7	0	0.0	64	100.0
•	Instructional improvement..	50	78.1	12	18.8	2	3.1	64	100.0
•	Ensuring quality standards.	61	95.3	3	4.7	0	0.0	64	100.0
•	Ensuring proper resource management	60	93.8	4	6.2	0	0.0	64	100.0
•	Creating a conducive teaching and learning environment.	62	96.9	2	3.1	0	0.0	64	100.0
•	Giving constructive feedback and support.	53	82.8	8	12.5	3	4.7	64	100.0
•	Fostering collaboration among supervisors and teachers.	60	93.8	4	6.2	0	0.0	64	100.0

Results of findings in table 1 shows that respondents on all the items agreed that: promoting teacher professional development; instructional improvement; ensuring quality standards; ensuring proper resource management; creating a conducive teaching and learning environment; giving constructive feedback and support; and fostering collaboration among supervisors and teachers were considered to be the major roles of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja with the highest percentage scores of: 70.3; 78.1; 95.3; 93.8; 96.9; 82.8; and 93.8 respectively. Only the percentage scores of 29.7; 18.8; 4.7; 6.2; 3.1; 10.5 and 6.2 of respondents disagreed respectively, while the percentage scores of 0.0; 3.1; 0.0; 0.0; 0.0; 4.7 and none respondents undecided respectively on the items.

Research Question Two: What are the challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja, Nigeria?

Table 2: Challenges of Effective School Instructional Supervision in Public Secondary Schools in Kwali Area Council, FCT, Abuja

S/N	Items	Agree		Disagree		Undecided		Total	%
		F	%	F	%	F	%		
1.	Insufficient number of supervisors	48	75	16	20	0	0	64	100
2.	Inaccessibility of unregistered schools..	20	31.3	43	67.2	1	1.5	64	100
3.	Lack of inspection equipment.	55	85.9	9	14.1	0	0	64	100
4.	Large number of unregistered schools.	16	25	48	75	0	0	64	100
5.	Poor funding of education.	60	93.8	4	6.2	0	0	64	100
6.	Unsupportive principals and teachers.	49	76.5	12	18.8	3	4.7	64	100
7.	Bribery and corruption.	62	96.9	2	3.1	0	0	64	100
8.	Absence of effective follow-up.	24	37.5	40	62.5	0	0	64	100
9.	Untrained supervisors.	56	87.5	8	12.5	0	0	64	100
10.	Poor implementation of supervision reports.	60	93.8	3	4.7	1	1.5	64	100

Results of findings in table 2 indicated that respondents on items 3, 5, 6, 7 9 and 10 agreed that: insufficient numbers of supervisors; lack of inspection equipment; poor funding of education; unsupportive principals and teachers; bribery and corruption; untrained supervisors; and poor implementation of supervision reports were considered to be challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja with the highest percentage scores of 75.0; 85.9; 93.8; 76.5; 96.9; 87.5; and 93.8 respectively. Consequently, results in table 2 also showed that respondents on items number 2, 4 and 8 disagreed that: inaccessibility of unregistered schools; large number of unregistered schools; and absence of effective follow-up were not considered to be challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja with the highest percentage scores of 67.2; 75.0; and 62.5 respectively. Only the percentage

scores of 25.0; 67.2; 14.1; 75.0; 6.2; 18.8; 3.1; 62.5; 12.5; and 4.7 of respondents disagreed respectively on the items, while the percentage scores of 0.0, 1.5, 0.0, 0.0, 0.0, 4.7, 0.0, 0.0, 0.0, and 1.5 of respondents undecided respectively on the items.

Discussion of Findings

The findings on research question one revealed that: promoting teachers' professional development; instructional improvement; ensuring quality standards; ensuring proper resource management; creating a conducive teaching and learning environment; giving constructive feedback and support; and fostering collaboration among supervisors and teachers are the major roles of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja. This is in line with the assertion of Igbineweka and Mani (2015) and Iyejare (2023), that instructional improvement; professional development; resource management; creating positive learning environment; fostering collaboration among others are some of the key roles of effective school supervision. This is also in agreement with the findings of Allen (2015) that the tasks of effective school supervision include among others such as curriculum and instruction; collaboration; teachers' professional training and creating a good working environment.

The findings on research question two attempts to find out the challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja. The result of the findings revealed that: insufficient number of supervisors; lack of inspection equipment; poor funding of education; unsupportive principals and teachers; bribery and corruption; untrained supervisors; and implementation of supervision on reports were some of the challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja. The findings is in agreement with the findings of Iyejare (2023) that, poor funding of education; lack of inspection tools; corruption and bribery; lack of enough supervisors and poor implementation of supervision supports among others were some of the problems of school supervision. This is in tandem with Allen (2015) who opined that, the problems of school supervision include: inadequate funding; poor infrastructure; poor teaching and learning facilities; implementation problems; poor planning and inexperienced supervisors among others. This also agreed with the findings of Ejeh (2016) that, supervisory lapses include: motivation of supervisory staff; lack of cooperation between the supervisors and teachers; problem of funds and communication as constraints to supervision is below standard, among others. In addition, results of findings in table two showed that: inaccessibility in unregistered schools; large number of unregistered school; and absence of effective follow-up were not considered to be challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja. The finding is in agreement with the findings of Olivia (2016), that absence of effective follow-up, large number of unregistered schools and

inaccessibility of unregistered schools were not challenges of school supervision. This finding disagreed with the finding of Iyejare (2023) who viewed that: inaccessibility of unregistered school; large number of unregistered schools; and absence of effective follow-up were some of the problems of effective school instructional supervision in public secondary schools.

Conclusion

The study reviewed the major roles of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja which include promoting professional development; instructional improvement; ensuring quality standards; ensuring resource management; creating a conducive teaching and learning environment; giving constructive feedback and support; and fostering collaboration among supervisors and teachers. The study also revealed challenges of effective school instructional supervision in public secondary schools in Kwali Area Council, FCT, Abuja which include: insufficient number of supervisors; lack of inspection equipment; poor funding of education; unsupportive principals and teachers; bribery and corruption; untrained supervisors; and poor implementation of supervision reports.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. There should be at least two vice principals in every public secondary school. This personnel will help the principal in his or her administration duties so that more attention is given to supervision.
2. Government should provide more adequate transport and supervision/inspection facilities in schools.
3. Public schools should think of how to generate more funds (revenue) without increasing school fees arbitrarily in order to facilitate the provision of some basic educational facilities for learning. This can be done by organizing inter-house sports activities or appeal fund raising where some Old Students Association rich personalities could be invited to donate generously so as to enhance the functions of the supervisor.
4. Government should provide adequate support for principals and teachers in areas of school instructional supervision.
5. There should be continuing training and retraining of school principals and supervisors to be abreast with current best practices. Conferences, seminars, workshops, etc are usually helpful.
6. Government should ensure that supervisors reports are implemented as at when due.

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CHAPTER TEN

DEVELOPMENT OF SCIENCE AND TECHNOLOGY EDUCATION IN NIGERIA: CHALLENGES AND WAY FORWARD

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Introduction

Science and technology education has become integral part of the world's culture and any country that overlooks this significant truism does so at its own peril (Ojebiyi & Fasakin, 2014). No nation can make any meaningful development without science and technology education. Science and Technology Education in Nigeria is broadly conceptualized as a structured educational process aimed at equipping learners with scientific knowledge, technological skills, and problem-solving competencies required for personal development and national progress. From a policy perspective, the Federal Government of Nigeria defines science and technology education as the systematic teaching and learning of science and technology at all levels of the educational system, designed to develop appropriate skills, mental attitudes, and competencies that enable individuals to live effectively in society and contribute meaningfully to national development (Federal Government of Nigeria, 2013). It can also be described as the training given to students in our institutions of learning so as to produce scientists and technologists for national development. According to Ojebiyi and Fasakin (2014), the term science and technology education has been variously defined as all the learning experiences, activities, planned, designed and organized for different disciplines in basic science and technology.

Science according to Webster's New Collegiate Dictionary in Wasagu (2013) is "knowledge attained through study or practice or knowledge covering general truths of the operation of general laws especially as obtained and tested through scientific method and concerned with the physical world" while technology is the application of scientific theory and practice. According to Brownoski (1974), in Wasagu (2013), the aim of science is not to open door to infinite wisdom but to set a limit in infinite errors. However, Asabere-Aweyaw (2013) stated that while science is concerned about general explanations of reality; technology is concerned about finding workable solutions to practical problems.

Science is derived from the Latin word “scientia,” which means what to know, what a fact, truth or specific is. Science is a body of knowledge and processes studied for the possibilities it offers for the development and advancement of technology. It is a branch of knowledge empirically acquired through observation, experimentation, tests, and logical analysis. Science is the bedrock upon which any nation can be built. Science education is the process of helping students to develop a deeper understanding of the natural world and to acquire the skills and attitudes necessary to participate in scientific inquiry and to make informed decisions about scientific issues (Orborne & Dillon, 2008 in Agboola, 2025).

In Nigeria, the desire towards the development of science and technology education is clearly stated in the National Policy on Education (FRN, 2013). This is because science and technology education is the bedrock upon which developed countries such as Japan, United States of America and China built their development. As stated by Isei and Adegun (2021), the measure of scientific and technological knowledge of any citizen in a nation determines the level of development of that nation. Science and technology is needed to enhance the transformation of a country.

The objectives of the National Policy on Science and Technology Education (FRN, 2018) include the following:

- ensure that young people entering the Nigerian workforce of the 21st centuries have the knowledge and skills necessary to promote economic, scientific and technological development;
- give the citizens of Nigeria an understanding of scientific and technological approaches and evidence so that they will be able to make informed decisions on scientific and technological issues;
- ensure that products of Nigerian Science and Technology Education programmes can compete favourably at the global levels; and
- provide employers with the skills and competencies required for competitiveness and sustainable economic self-reliance.

History revealed that the development of science has its roots in Mesopotamia and Ancient Egypt between 3000 – 1200 (BC). The Ancient Egyptians were known for creating scientific principles that developed subjects such as Mathematics, Astronomy, Medicine, Mummification, Engineering, Architecture, Agriculture, and Fermentation. The Egyptians were committed to building pyramids, storing their food systematically and using horses for chariots. These developments were based on innovations (Rochberg, 2018).

The second emergence of science which started in the 16th Century was as a result of the Copernicus-Newton Revolution. The works of Newton enhanced scholars’ ability to understand how the world works and the principles it applies to future development.

Newton asserted that applying the principles of science is crucial to promoting sustainable societal changes (Huff, 2016). The Industrial Revolution 1760 – 1840, also contributed to the development of science. The industrial revolution is primarily linked to the growth of technology for industrial activities (Isioto, Philip-kpae and Dickon, 2017).

Development of Science and Technology Education in Nigeria

The root of science and technology education in Nigeria can be traced back to the colonial era when the British education policies began to shape the Nigerian education system (Babajide, 2015). Initially, education in Nigeria emphasized on religious instruction and basic literacy. The teaching and learning of science and technology in Nigeria can be dated back to when it became a feature in the school curriculum. According to Maccido (2013), by 1859 the first grammar school was founded and due to the dearth of science and technology teachers, Yaba High College was established in 1932 to cater for this need.

According to Ekpo (1993) in Ojebiyi and Fasakin (2014), the history of science teaching in Nigeria began with the teaching of nature study in Nigerian schools in 1893. The emphasis was mainly on personal hygiene and environmental sanitation. It was revealed that science and technology education then was not given adequate attention as the religious education. Later, some missionary schools like Hope Waddell Institute, Calabar founded in 1861; St. Andrew College Oyo, founded in 1899 and others were able to introduce science education in their curriculum. Among the Colleges, King's College, Lagos was the first to offer science and technology education to the standard of Cambridge University Senior Local Examination (Taiwo, 1980 in Ojebiyi and Fasakin, 2014). In 1920, the teaching of science became more recognized. That was the time Phelps-stokes Commission was set up to examine the process of education in Africa and made recommendations. In 1922, the report was out and it was found that the science education was deficient and the inclusion of science subjects in the curriculum of all secondary schools in Nigeria was recommended. With the commission's report in 1925, a memorandum was set up. The memorandum made provision for studying science and technology education in higher institutions. This led to the establishment of Yaba College, Lagos in 1934 with courses in medicine, engineering, agriculture science and teacher education which led to the award of the College Diploma which lasted at least four years (Oyedeji, 2001 in Ojebiyi, 2014).

A commission was set up in 1949 by the Nigeria government to look into the possibility of establishing polytechnic that will address the Nigeria's needs. The commission recommended the establishment of a Nigeria College of Arts, Science and Technology with branches in each of the three regions into which the country was then divided (Fafunwa, 1974). Before the setting up of the commission, the demand for the training

of indigenous teachers was required. This led to the establishment of the University College, Ibadan in 1948 as an outpost of the University of London. A bill for the founding of the College was introduced into the Nigerian legislature in April 1952. As revealed by Fafunwa (1974), the first branch of the College opened in Zaria in January 1952. The Ibadan branch opened in February, 1954 while the Enugu branch opened in 1955. They were to offer courses in Science and Arts related subjects. In 1959, the government of Nigeria appointed another commission headed by Eric Ashby to conduct an investigation into the Nigeria's need in the field of post-secondary certificate and higher education over the next twenty years, 1960-1980 (Fafunwa, 1974). The recommendations of the commission paved way for the offering of courses in Engineering, Medicine and Agriculture and teacher education in science and technology in higher institutions. According to Fafunwa (1974), in Ojebiyi and Fasakin (2014), the three branches of the Nigerian Colleges of Arts, Science and Technology were closed in 1962, and absorbed into three new Universities; the Enugu branch became part of the University of Nigeria, Nsuka, the University of Ife absorbed the Ibadan branch, while Ahmadu Bello University absorbed the Zaria branch.

Contributions of Professional Organizations in the Development of Science and Technology Education in Nigeria

The Education Ordinances of 1960 brought modest improvements to the content of science education in Nigeria. Earlier, in 1952, an examination body was established with its headquarters in Accra, Ghana, which later became the West African Examinations Council (WAEC). WAEC subsequently reviewed the curricula of school subjects, including science, and conducted its first examinations in 1955 (Fafunwa, 1974). Professional bodies such as Science Teachers Association of Nigeria (STAN) and Science Association of Nigeria (SAN) were established on November 1957. These bodies reviewed the WAEC and Higher School Certificate (HSC) Science Curriculum in 1958. Several conferences were organized to identify science education problems and deliberate on improving science teaching and learning. Among the conferences, we have the National Curriculum Conference in September 8 – 12, 1969 that gave birth to science curriculum and other curriculum reforms in education. It also brought about the new National Policy on Education in 1977 revised in 1981, 1998, 2004 and 2013.

Some materials in science were produced for primary and secondary levels, such as the Nigeria Secondary School Science Project (NSSP) that was developed by the defunct Comparative Education Study and Adaptation Centre (CESAC), and now merged into the Nigerian Educational Research and Development Council (NERDC) and Science Teacher Association of Nigeria (STAN) for secondary schools. The Nigerian Integrated Science Projects (NISP) and National Primary Science and Mathematics Project (NPSMP) for primary school science were also produced (Agboola, 2025). As revealed

by Ivowi (1990), the training of science teachers during the long vacation holiday and the development of standard equipment as the minimum standard for science education in Nigeria are the two significant undertakings embarked upon by STAN and NERDC. The Science Teacher Association of Nigeria (STAN) and Science Association of Nigeria (SAN) as much as possible act as curriculum development techniques. They are responsible for the production of students' textbooks, teachers' guide, and audio-visual materials just similar to the works of Nigerian Educational Research Council (NERDC), Comparative Education Study and Adaptation Centre (CESAC) Nigeria Integrated Science Project (NISP) and many other curriculum agents. The CESAC was saddled with the responsibility of carrying out curriculum reviewing especially in science subjects. This has resulted to the production of Nigerian Secondary School Science Project (NSSSP). The three major components of NSSSP are Biology, Chemistry and Physics. Also, the West African Examination Council (WAEC) resolutions and syllabuses (1984) incorporated the science curriculum contents for both the NSSSP and traditional programme.

Challenges Facing the Development of Science and Technology Education in Nigeria

Science and Technology Education (STE) is widely acknowledged as a critical catalyst for national development, technological innovation, and economic competitiveness. In Nigeria, the strategic importance of STE is clearly articulated in national education policies; however, its development has been persistently constrained by a range of systemic challenges. These challenges cut across funding, infrastructure, human resources, curriculum relevance, policy implementation, and socio-cultural factors, collectively undermining the effectiveness of science and technology education in the country.

Inadequate Funding of Science and Technology Education - One of the most fundamental challenges confronting the development of science and technology education in Nigeria is inadequate funding. Science and technology programmes are capital-intensive, requiring substantial investment in laboratories, equipment, consumables, research facilities, and teacher training. However, Nigeria's budgetary allocation to education has consistently fallen below the UNESCO recommended benchmark of 15–20%, with even smaller proportions dedicated to science and technology education (UNESCO, 2017). Scholars argue that poor funding has resulted in dilapidated laboratories, insufficient instructional materials, and limited research output in science-related disciplines (Aina, 2017; Okebukola, 2019). This financial inadequacy directly affects the quality of teaching, learning, and innovation in science and technology education.

Shortage of Qualified and Competent Science Teachers - The availability of qualified science and technology teachers is central to the effective delivery of STE. In Nigeria, there is a persistent shortage of professionally trained science teachers, particularly in rural and underserved areas (Ogunniyi, 2016). In many schools, science subjects are taught by non-specialists, leading to poor content delivery and superficial understanding of scientific concepts. Furthermore, limited opportunities for continuous professional development have left many teachers ill-equipped to adopt modern pedagogical approaches, inquiry-based learning, and digital technologies (Adeniyi & Omotayo, 2020). This situation negatively affects students' interest, achievement, and retention in science and technology disciplines.

Inadequate and Obsolete Infrastructure and Facilities - Another major impediment to the development of science and technology education in Nigeria is the inadequacy of physical infrastructure and instructional facilities. Many schools and tertiary institutions lack functional laboratories, workshops, libraries, and information and communication technology (ICT) facilities (Federal Government of Nigeria [FGN], 2013). Where laboratories exist, they are often poorly equipped, obsolete, or overcrowded, limiting opportunities for practical experimentation and skills acquisition. Research has shown that the absence of functional laboratories contributes significantly to students' poor performance and negative attitudes toward science subjects (Aina & Akintunde, 2013).

Outdated and Theoretical Curriculum - The relevance and responsiveness of the science and technology curriculum remain a critical concern. Several studies have noted that Nigeria's STE curriculum is overly theoretical, examination-oriented, and insufficiently aligned with contemporary scientific advancements and local socio-economic needs (Okebukola, 2019; World Bank, 2020). Emerging areas such as artificial intelligence, renewable energy, robotics, biotechnology, and digital innovation are inadequately reflected in existing curricula. This disconnect limits learners' ability to apply scientific knowledge to real-life problems and reduces the employability of graduates in science and technology-related fields.

Weak Policy Implementation and Governance Challenges - Although Nigeria has developed several policies aimed at promoting science and technology education, weak implementation remains a major obstacle. Poor coordination among government agencies, inadequate monitoring mechanisms, corruption, and inconsistent policy continuity have hindered the realization of policy objectives (Ofoegbu, 2014). As a result, well-designed policies often fail to translate into meaningful improvements at the classroom and institutional levels. This governance deficit has contributed to persistent gaps between policy intentions and actual practice in science and technology education.

Low Student Interest and Negative Attitudes toward Science - Student interest and motivation play a crucial role in the success of science and technology education. In Nigeria, many students perceive science subjects as difficult, abstract, and unattractive, largely due to poor teaching methods, lack of practical activities, and inadequate career guidance (Ogunleye, 2015). Societal attitudes that favor non-science careers further discourage students from pursuing science and technology pathways. This trend has resulted in declining enrolment and low completion rates in science-based programmes, thereby weakening the national science and technology workforce.

Digital Divide and Limited ICT Integration - In the contemporary knowledge economy, effective integration of ICT into science and technology education is essential. However, Nigeria continues to grapple with a significant digital divide characterized by limited access to computers, internet connectivity, and digital learning resources, especially in public schools (World Bank, 2020). Inadequate ICT infrastructure and limited digital competence among teachers constrain the adoption of e-learning, virtual laboratories, and other technology-driven instructional strategies that could enhance science and technology education.

Way Forward

Prioritization of Sustainable Funding for Science and Technology Education - The government should significantly increase and sustain funding for science and technology education across all levels of the education system. Dedicated budgetary provisions should be made for laboratory development, procurement of modern equipment, research funding, and maintenance of facilities. In addition, alternative funding mechanisms such as education trust funds, competitive research grants, and public-private partnerships should be strengthened to complement government efforts and ensure long-term financial sustainability.

Strengthening of Preparation, Recruitment, and Retention of Qualified Science Teachers - A robust science and technology education system depends on the availability of well-trained teachers. Teacher education programmes should be strengthened to emphasize both subject mastery and modern pedagogical skills. Qualified science teachers should be equitably recruited and deployed, especially to rural areas, while incentives such as improved remuneration, housing, and career advancement opportunities should be provided to enhance motivation and retention.

Institutionalization of Continuous Professional Development for Science Educators - Continuous professional development should be made compulsory for science and technology teachers to keep them abreast of emerging scientific knowledge, innovative teaching methods, and digital tools. Regular workshops, seminars, and in-service

training programmes should focus on inquiry-based learning, practical experimentation, assessment strategies, and effective integration of ICT into science teaching.

Upgrading and Modernization of Science and Technology Infrastructure -

Educational institutions should be equipped with functional, modern laboratories, workshops, libraries, and ICT facilities that support experiential learning. Existing infrastructure should be rehabilitated and upgraded to meet current scientific standards, while new facilities should be established where gaps exist. Reliable electricity and internet access must also be ensured to support technology-driven teaching and research.

Reforming and Modernization of Science and Technology Curriculum -

The science and technology curriculum should be periodically reviewed to ensure relevance to national development needs and global scientific trends. Emerging fields such as artificial intelligence, renewable energy, biotechnology, robotics, and environmental sustainability should be integrated into the curriculum. Greater emphasis should be placed on practical work, problem-solving, creativity, and entrepreneurship to enhance learners' skills and employability.

Strengthening of Policy Implementation, Monitoring, and Governance -

Effective implementation of science and technology education policies requires strong governance structures. Clear implementation frameworks, regular monitoring, and transparent evaluation mechanisms should be established to track progress and outcomes. Improved coordination among relevant ministries, agencies, and stakeholders will reduce duplication of efforts and ensure consistency in policy execution.

Expansion and Integration of ICT and Digital Learning Tools -

The integration of ICT into science and technology education should be aggressively pursued to improve access and quality. Digital resources such as virtual laboratories, simulations, online learning platforms, and open educational resources should be widely adopted. Teachers and students must be trained in digital literacy to maximize the benefits of technology-enhanced learning.

Strengthening of Industry, Research, and Education Linkages -

Strong collaboration between educational institutions, industry, and research organizations should be encouraged to align science and technology education with labor market needs. Internship programmes, industrial attachments, joint research projects, and innovation hubs should be promoted to provide students with practical exposure and foster innovation. Such linkages will also enhance the commercialization of research outputs.

Stimulation of Students' Interest and Participation in Science and Technology -

Deliberate efforts should be made to increase students' interest and participation in science and technology disciplines. Science clubs, competitions, exhibitions, innovation challenges, and mentorship programmes should be institutionalized at all levels of

education. Scholarships, grants, and incentives should be provided to support students pursuing science and technology-related programmes, particularly those from disadvantaged backgrounds.

Promotion of Inclusive and Community-Based Support for Science and Technology Education - The private sector, non-governmental organizations, professional bodies, and local communities should be actively involved in supporting science and technology education initiatives. Community-based partnerships can support infrastructure development, mentorship, and advocacy, while private sector involvement can provide resources, expertise, and employment pathways. Inclusive stakeholder engagement will enhance ownership and sustainability of science and technology education reforms.

Conclusion

Science and technology education remains a cornerstone for national development, innovation, and global competitiveness, particularly for a developing country such as Nigeria. As this discussion has shown, despite its recognized importance and inclusion in national education policies, the development of science and technology education in Nigeria continues to face persistent and interrelated challenges. Inadequate funding, shortage of qualified teachers, obsolete infrastructure, outdated and overly theoretical curricula, weak policy implementation, limited ICT integration, and low student interest have collectively undermined the effectiveness of science and technology education across all levels of the educational system. These challenges have far-reaching implications for Nigeria's aspiration toward technological self-reliance, industrial growth, and sustainable development. A weak science and technology education system limits the country's capacity to produce skilled manpower, drive research and innovation, and respond effectively to contemporary global and local challenges. Consequently, Nigeria remains largely dependent on imported technologies and struggles to fully harness the creative and intellectual potential of its growing population.

However, the challenges confronting science and technology education in Nigeria are not insurmountable. With deliberate and sustained commitment, the sector can be revitalized to play its expected transformative role. Increased and sustainable funding, strengthened teacher education and professional development, improved infrastructure, curriculum modernization, effective policy implementation, and meaningful integration of digital technologies are critical steps toward reform. Equally important is the need to strengthen collaboration among government, educational institutions, industry, communities, and other stakeholders to ensure relevance, accountability, and sustainability.

In summary, the advancement of science and technology education in Nigeria hinges on a collective commitment to transcend policy declarations and implement sustained, practical actions. Through the adoption of comprehensive and well-coordinated strategies, science and technology education can be repositioned as a critical driver of innovation, economic diversification, and human capital development. This transformation is vital not only for national development but also for enhancing Nigeria's competitiveness within the rapidly evolving global knowledge economy.

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CHAPTER ELEVEN

GENDER AND SCHOOL CURRICULA: A CRITICAL PHILOSOPHICAL EXAMINATION OF THE DISEMPOWERMENT OF THE GIRL-CHILD IN EDUCATION

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Introduction

The educational system plays a pivotal role in shaping the values, beliefs, and aspirations of future generations. However, across many societies, secondary school curricula have been historically structured in ways that seem to reflect gender biases and perpetuate traditional roles that marginalize certain groups, especially girls. This study explores the gendered nature of secondary school curricula, examining the subtle and overt ways in which gender inequality is embedded within educational content and pedagogy. The focus is specifically on the disempowerment of the girl child, analyzing how the underrepresentation of women in educational materials and the reinforcement of masculine norms limit girls' potential in academic and professional spheres. By analyzing how gendered content manifests in secondary school curricula, this study aims to not only highlight existing inequities but also propose strategies to transform educational spaces into empowering environments where all students, especially girls, are equally valued and supported.

Conceptual Framework

Educational Philosophy: Educational philosophy critically examines the underlying principles, purposes, and practices within educational systems, revealing the ideological forces that influence curriculum content and teaching methods. Philosophers such as John Dewey viewed education as a transformative process, emphasizing its role in social progress and reform. Dewey's assertion that "education is the fundamental method of social progress and reform" highlights the belief that education should actively challenge and transform existing societal structures, rather than passively perpetuating them.

In this context, education becomes a site of contestation—a space where gender roles are not only taught but can be either reinforced or disrupted. Paulo Freire (1970) extended Dewey's ideas by emphasizing that education should not merely reproduce existing societal structures, but instead critically engage with those structures to confront

inequalities. Freire's Pedagogy of the Oppressed introduced the idea that education should be a liberatory process that empowers individuals, particularly marginalized groups, to actively transform society. Bell Hooks (1994), drawing on both critical pedagogy and feminist philosophy, discusses how education can be reimagined as a space of freedom and empowerment for all students, particularly those marginalized by race, class, and gender. Her framework emphasizes feminist pedagogy, which aims to flatten power dynamics in the classroom and create an environment in which all students (especially girls) are empowered to voice their experiences, challenge stereotypes, and break through oppressive societal norms. Thus, when viewed through the lenses of critical pedagogy and feminist philosophy, education is not just a tool for the transmission of knowledge but also a site for challenging the gendered ideologies embedded in curricula. In this way, the curriculum is both a reflection of and a challenge to dominant gender norms, acting as a mechanism for either perpetuating or disrupting inequality.

Gender and Education: A Theoretical Overview

Judith Butler's (1990) concept of gender performativity plays a crucial role in understanding how gender is constructed through actions, behaviors, and interactions within educational contexts. For Butler, gender is not an inherent trait but is rather the result of repeated behaviors that are shaped by societal norms. In this sense, education becomes a central space for the reinforcement of traditional gender roles, as schools often teach students to "perform" their gender in specific, socially accepted ways. Curricula that omit or misrepresent the contributions of women serve to reinforce male-dominated narratives, which perpetuate the idea that masculine perspectives are the norm while feminine ones are marginalized or absent.

Drawing from Michel Foucault's (1977) theory of power/knowledge, it is important to understand how the transmission of gendered knowledge in schools operates as a form of social control. Foucault's work highlights that knowledge is always intertwined with power (the production of knowledge is a form of governance). In the case of gendered knowledge, the curriculum does not simply teach content but also disciplines students' bodies, shaping their understanding of themselves and their roles within a gendered hierarchy. Foucault's theory underscores the idea that the power structures in schools not only regulate students' actions but also their gendered identities, thereby reproducing societal inequalities. In education, gendered knowledge acts as a tool of governance, guiding how students are expected to behave and how they are positioned in relation to gendered expectations. The curriculum, therefore, is not just a neutral vehicle for transmitting knowledge but a mechanism through which gender identities are constructed, maintained, and policed.

Curriculum as a Gendered Construct: The concept of curriculum as a gendered construct reflects the idea that educational content is not neutral or objective, but shaped by the gendered power dynamics in society. Scholars such as Apple (2000) and Collins (2000) argue that curricula function as tools for the social reproduction of dominant ideologies—including gendered ideologies. These ideologies are embedded not only in the overt content of lessons but also in the hidden curriculum, which shapes how students are expected to behave and interact based on their gender. For instance, when male figures dominate historical narratives, or men are predominantly depicted as scientists and inventors, girls are implicitly taught that these roles and accomplishments are not for them. This gender bias restricts the educational experiences of girls and limits their academic potential by reducing their engagement with certain subjects, particularly in areas like STEM. The gendered nature of curricula is not limited to the content itself, but also extends to teaching methodologies. Teachers often unknowingly reinforce gendered stereotypes through classroom interactions, favouring male students in fields traditionally dominated by men, such as mathematics and science. In contrast, girls are more likely to be encouraged to pursue traditionally “feminine” subjects, such as literature, art, and social studies. This gendered division of knowledge within the curriculum has real-world consequences, as it limits girls' opportunities to pursue careers in fields like engineering, physics, and technology.

Masculine Terms and Examples in School Subjects

The absence of female-centered narratives in textbooks is a clear manifestation of gender inequality in education. Studies by Sadker & Sadker (1994) and Moss-Racusin et al. (2012) highlight how male figures are predominantly represented in history, science, and literature. For instance, history textbooks often focus on male leaders, explorers, and inventors, while women's contributions are either ignored or presented in a peripheral, passive manner. This gender bias not only omits the important roles that women have played throughout history but also subtly reinforces the notion that men are the primary agents of social change and intellectual development. Moreover, in subjects like mathematics and science, the portrayal of male scientists as the default experts perpetuates the stereotype that these fields are not for girls. The absence of female role models in these subjects leads to a situation where girls may subconsciously believe that they are less capable in these areas, thereby hindering their academic engagement and performance.

Pedagogical Practices and Gender Bias

Beyond the content of the curriculum, gender bias in pedagogy also plays a critical role in the reproduction of gender inequality in education. Research indicates that teachers, even when well-intentioned, often display unconscious gender biases in the classroom. Studies by Sadker & Sadker (1994) and Moss-Racusin et al. (2012) reveal that teachers tend to give more attention and encouragement to male students, particularly in subjects

traditionally dominated by men. These biases contribute to gendered academic outcomes and impact girls' self-confidence, particularly in subjects like mathematics and science, where they may feel less capable or less encouraged to participate. The classroom, then, becomes a site of gendered interaction where power dynamics play out not only in terms of the content taught but also in terms of who gets to speak, who is validated, and who is dismissed. These gendered dynamics in the classroom can significantly affect a girl's academic performance, self-perception, and motivation.

The Disempowerment of the Girl Child through Gendered Content

The psychological effects of a gendered curriculum on the girl child are profound and multifaceted. The absence of female representation and the dominance of masculine perspectives in textbooks, media, and classroom content have significant psychological ramifications for girls. As Sadker and Sadker (1994) argued, when girls are exposed to a curriculum that primarily reflects male experiences and figures, they often experience alienation from subjects and fields that are deemed "masculine." This alienation is not just intellectual but emotional, as girls begin to internalize the idea that certain subjects or careers are beyond their reach. The psychological disempowerment that results from this disconnect can manifest in lower self-esteem, reduced motivation, and a diminished sense of academic agency. Gilligan's (1982) work on the ethics of care provides a valuable lens for understanding how girls, in particular, are affected by gendered curricula. Unlike the dominant educational model that often emphasizes individualism and competition, the ethics of care focuses on relationship-building and interdependence (values often associated with femininity). When these values are omitted or undervalued in curriculum design, girls may feel that their relational and emotional intelligence is not valued in academic settings, further perpetuating feelings of disconnection and inadequacy in subjects that emphasize logic, competition, and detachment from others. Empirical evidence strengthens the argument that the lack of representation in curricula fosters psychological alienation. Studies like Moss-Racusin et al. (2012) show how gender bias in STEM not only affects teachers' perceptions of girls' abilities but also diminishes girls' confidence in their aptitude for those fields. This diminishment in confidence often results in a lower likelihood of girls pursuing careers in science, technology, engineering, and mathematics (STEM), fields that are notoriously male-dominated. These subjects, often seen as "masculine" due to their historical association with male figures, reinforce a narrative in which girls are less likely to succeed, even when they have the ability to do so. Moreover, gendered pedagogy plays a critical role in this disempowerment. When teachers, often unintentionally, favor boys in classroom interactions—such as giving them more opportunities to speak, encouraging their participation in technical subjects, or providing them with more direct praise—this reinforces gender disparities. Schunk (1991) emphasized the importance of self-efficacy in academic success, arguing that students are more likely to excel when they have confidence in their abilities. When girls consistently encounter barriers to developing

self-efficacy in traditionally male-dominated subjects, they internalize a belief that they are not capable of excelling in these fields, which results in disengagement and underachievement. The foregoing underscores the need for a curriculum that is gender-inclusive, one that not only features female role models but also reflects an understanding of gendered cognitive styles and relational learning. Providing girls with both academic role models and learning environments that value their contributions can empower them to engage more deeply in their education, particularly in fields from which they have traditionally been excluded.

Intersectionality: How Gender, Race, and Class Compound Disempowerment

The experience of gendered curricula is not uniform among all girls; it is shaped by a complex web of intersectional identities. Kimberlé Crenshaw's (1989) theory of intersectionality helps us understand how the simultaneous oppression of gender, race, class, and other social identities compounds the marginalization of girls in education. Girls from racially marginalized communities, such as Black, Latina, or Indigenous girls, face unique challenges in education. These girls often encounter multiple forms of discrimination, not only due to their gender but also their race and socioeconomic status. Mayer's (2005) work demonstrates that Black girls in the United States are subject to race-gender stereotypes that influence teachers' perceptions of their academic potential, often leading to lower academic expectations and fewer opportunities for advancement. For girls of color, the gendered curriculum does not just exclude female role models but over represents male figures—especially white male figures—thereby reinforcing racialized gender hierarchies in education. These girls are doubly marginalized because not only are their gendered experiences omitted, but their ethnic identities are also underrepresented in textbooks and classroom discussions. As Crenshaw (1989) argues, race and gender cannot be understood in isolation; they must be analyzed as intersecting identities that shape girls' experiences in profound ways.

Additionally, the experiences of low-income girls are often overlooked in generalized discussions about gender in education. These girls may not only face gender bias in curricula but also experience economic inequality, inadequate resources, and cultural barriers that hinder their ability to access the same educational opportunities as their more privileged peers. Solórzano and Yosso (2002) highlight that the educational system is structured in ways that favor the upper-middle-class student, and low-income girls of color face multiple systemic obstacles that compound their educational disempowerment. These barriers are rarely addressed in discussions of gender equality, leading to an underestimation of the specific challenges that these girls face.

The intersectionality of gender, race, and class necessitates a comprehensive approach to curriculum reform. Simply addressing gender bias without accounting for the compounded effects of racism and classism will not result in meaningful change.

Curriculum reforms need to be intersectional, acknowledging and addressing the unique needs of marginalized girls. This approach will ensure that girls who experience the compounded effects of multiple oppressions are not left behind in the push for gender equality in education.

The Importance of Female Role Models in Education

The importance of representation in education cannot be overstated. Bell (1994) contends that representation is critical in empowering marginalized groups, particularly girls, because it allows them to envision themselves as capable of excelling in traditionally male-dominated fields. The absence of female role models in textbooks, classroom discussions, and educational content can create a sense of invisibility for girls, making them feel that their potential contributions to science, politics, literature, and other fields are irrelevant or unworthy of attention. This lack of visibility sends a powerful message that these fields belong to men, not to them. Incorporating female role models in curricula not only provides girls with examples of successful women but also challenges the gender stereotypes that have traditionally dominated these subjects. For example, the inclusion of Marie Curie, Ada Lovelace, and Mae Jemison in science curricula can inspire girls to see themselves as capable contributors to scientific innovation. By placing female scientists and leaders alongside their male counterparts, girls can be empowered to aspire to careers in STEM or other fields that have historically been closed to them. Furthermore, the inclusion of women in the curriculum should go beyond simply adding female figures to existing content. It should involve a re-imagining of curricula that centers women's contributions to society, science, and culture. For example, history curricula could include more diverse narratives, showcasing not only female monarchs but also everyday women who have made significant contributions to their communities. This provides a fuller, more holistic view of history that recognizes the agency of women. Importantly, role models do not only come from textbooks. Teachers themselves can act as role models, particularly for young girls. Female teachers, in particular, can be instrumental in challenging the gendered dynamics in the classroom and providing girls with the support and guidance they need to succeed in male-dominated subjects. Mentorship from female teachers can provide girls with the confidence to pursue subjects in which they may otherwise feel out of place. The incorporation of female role models—both in curriculum content and in teacher-student relationships—is vital for the empowerment of girls. However, representation alone is insufficient. It must be accompanied by structural changes in educational systems, such as gender-inclusive teaching practices and the creation of support networks for girls pursuing non-traditional subjects.

Global Case Studies: Understanding Gender Inequality in Education

Gender inequality in education is a pervasive global issue that transcends cultural, geographical, and political boundaries. In many countries, gender biases in education continue to be institutionalized in both curricula and pedagogical practices, often hindering the development and empowerment of girls. A report by End Sexism in Schools (2025) in the UK highlights a significant concern: secondary school history lessons fail to adequately address the contributions of women. This pattern is not unique to England; similar trends can be observed globally, particularly in the United States, India, and Nigeria, where women's roles in history, science, and other disciplines are marginalized or completely omitted (Morris 2023; Kosir and Lakashminarayan 2024; Evers 2025). For example, in India, while the country celebrates numerous influential women in politics and science, the history curricula predominantly focus on male figures, often relegating women to peripheral roles. National Curriculum Framework (NCF) 2005 did attempt to integrate gender-sensitive pedagogy, but in practice, the gender disparity remains vast. The gender gap in STEM education in India is particularly stark, with fewer girls enrolling in technical fields and science courses due to entrenched societal norms about gender roles in intellectual and professional domains.

In the United States, despite decades of feminist advocacy, textbooks remain heavily biased toward male historical figures and leaders, often minimizing or ignoring the contributions of women, especially women of color. As Sadker and Sadker (1994) noted, American classrooms continue to prioritize male role models in subjects like mathematics, science, and history, resulting in an underrepresentation of women in leadership positions across various sectors. This neglect not only perpetuates gender stereotypes but also affects the educational aspirations of female students, limiting their perceived opportunities in fields traditionally dominated by men. On the other hand, Sweden serves as a notable exception in this global context. Sweden has implemented gender-neutral education reforms, making gender equality an integral part of the educational system. According to López et al. (2019), Sweden's education system is a model for countries striving to dismantle gender biases. The country has incorporated gender studies into the curriculum from an early age, with gender equality integrated into various subjects like history, literature, and even mathematics. Sweden's approach focuses on gender-neutral language and diverse representation, ensuring that textbooks and teaching materials feature both male and female perspectives, and challenge traditional gender roles. However, while Sweden's reforms have made notable strides, challenges still persist in ensuring that gender equality is consistently applied across all educational levels and institutions, especially in rural areas where more conservative norms may prevail.

While Sweden is a leader in gender-neutral education, other countries still face significant barriers to achieving gender parity in education. These barriers are often

compounded by cultural resistance and entrenched patriarchal values that influence both the content of curricula and classroom practices. Countries such as Nigeria and Brazil continue to struggle with gendered educational policies that marginalize women's contributions to history, science, and culture. Despite international advocacy for gender equality in education, many nations, particularly in sub-Saharan Africa and South Asia, are slow to enact or implement significant changes to their educational structures and curricula.

However, international organizations like UNESCO and UN Women are playing a critical role in advocating for gender-responsive educational reforms. These organizations promote policies that integrate gender equality into national curricula and provide resources for countries seeking to adopt gender-neutral reforms. Gender equality education is now part of the Sustainable Development Goals (SDGs), with SDG 4 calling for inclusive and equitable education and lifelong learning opportunities for all. While these global frameworks set ambitious goals, the challenge lies in translating these goals into practical, measurable outcomes within diverse educational contexts.

The Historical Roots of Gender Bias in Education

The historical roots of gender bias in education are deeply embedded in the patriarchal structures that have shaped educational systems worldwide. In many cultures, education was traditionally viewed as a privilege reserved for males, with girls' roles in society primarily confined to domestic spheres. The emergence of formal education systems in the Enlightenment period reflected the broader societal belief that women were inherently inferior to men, and therefore, their education should be limited to domestic tasks and moral development.

The Western educational tradition, particularly in the 18th and 19th centuries, reinforced the notion that women were intellectually inferior and thus did not require the same level of formal education as men. Jean-Jacques Rousseau, in his seminal work *Emile* (1762), argued that women's education should be solely focused on preparing them for their roles as wives and mothers, further entrenching the idea that women's place was in the domestic sphere. Mary Wollstonecraft, an early feminist philosopher, famously challenged this view in *A Vindication of the Rights of Woman* (1792), advocating for women's education as a means to promote equality. However, her ideas were not widely embraced until much later.

The exclusion of women from formal education continued into the colonial era, when colonial powers imposed their educational systems on colonized nations, further entrenching gender inequalities. In many colonized regions, the colonial education system was designed to serve the interests of the colonial rulers, with a focus on male education that prioritized Western knowledge over indigenous traditions. In Africa, for example, missionary schools were established to teach colonial subjects, but girls were

often excluded from these educational opportunities. Even when girls were allowed to attend school, the curriculum was heavily gendered, with little attention paid to women's roles in indigenous societies.

Ngũgĩ wa Thiong'o (1986) argues that the colonial education system sought to suppress indigenous knowledge systems, including the knowledge and contributions of women. The imposition of Western curricula erased the contributions of indigenous women to their communities, reinforcing a gender hierarchy that privileged men's knowledge. As a result, girls in colonized nations were often excluded from intellectual spaces, with their education relegated to basic literacy or domestic skills.

The legacy of this colonial education system continues to shape curricula today, particularly in postcolonial societies where colonial powers have long since left but their educational legacies persist. Postcolonial education systems, particularly in countries like Nigeria, India, and Kenya, still reflect the patriarchal biases of their colonial origins. In many of these nations, gender bias is evident in textbooks and the curricula, with female historical figures often omitted or marginalized in favor of male leaders. Women's contributions to independence movements and cultural development are often overlooked, reinforcing the notion that women have not played significant roles in shaping their nations.

However, there have been significant efforts to challenge these colonial legacies and rewrite educational curricula to reflect the contributions of women and marginalized groups. For example, in South Africa, the post-apartheid government has made efforts to decolonize the curriculum by integrating indigenous knowledge and gender studies into the education system. This includes revising history textbooks to ensure that women's contributions are acknowledged and celebrated. Despite these efforts, the process of decolonizing education and overcoming the legacy of colonial gender biases is slow and uneven. The colonial education system not only marginalized the knowledge of women but also reinforced gendered social structures that continue to impact girls' education today. The challenge for postcolonial societies is not only to dismantle these colonial legacies but also to challenge the gendered assumptions embedded in their educational systems. This requires a critical pedagogy that examines the historical roots of gender bias in education and works to transform both the content and practice of teaching.

Philosophical Research Approaches Adopted in this Paper

The methodological approach for this study employs a philosophical research method, utilizing documentary research alongside speculative, analytical, and prescriptive methodologies. This multifaceted approach ensures a comprehensive framework to examine the gendered curricula and its role in the disempowerment of the girl child. By

drawing on philosophical analysis, historical documentation, and ethical reasoning, this methodology not only seeks to uncover gender biases in educational systems but also offers solutions to transform curricula and create equitable learning environments.

Documentary Research Method: The documentary research method remains central to this study. This approach involves the critical examination of documents that reflect gendered assumptions, power structures, and the representation of women and girls within educational content. These include:

- Textbooks used in secondary schools across disciplines such as history, literature, science, and mathematics. Textbooks serve as primary sites where gendered ideologies are often embedded and perpetuated.
- Curriculum guidelines and syllabi issued by educational authorities, reflecting how gender roles are institutionalized within formal education.
- Scholarly articles, reports, and policy documents addressing gender inequality in education, gendered curricula, and the psychological effects of gendered content, particularly from intersectional perspectives.
- Historical documents tracking the evolution of curricula over time, particularly focusing on the systemic exclusion of female role models and the entrenchment of masculine ideologies in educational content.

By examining these documents, the study aims to identify gendered ideologies that influence how educational content is structured and delivered. A refined framework for selecting documents, especially considering diverse educational contexts (e.g., urban vs. rural, global North vs. global South), will be employed to ensure inclusivity and broad applicability.

This method allows for the critical deconstruction of how gender bias is embedded in educational materials and how such bias perpetuates disempowerment by excluding female contributions, reinforcing masculine norms, and disregarding the intersectionality of gender with other social identities, such as race and class.

Speculative Methodology: The speculative methodology serves to engage deeply with the philosophical assumptions that underlie gendered educational practices, using a theoretical lens to imagine and conceptualize a reformed education system. This methodology asks critical, forward-looking questions that allow for the exploration of new educational possibilities:

- How can gender-neutral education systems be designed to challenge and deconstruct entrenched gender norms in curriculum content and teaching practices? This question encourages us to imagine how curriculum content might be organized, how teaching methods could shift, and what kind of pedagogical philosophies would be required to create gender-inclusive educational spaces.

- What would a curriculum of empowerment for girls look like, if designed according to feminist pedagogical principles? This exploration is grounded in theorists like bell hooks and Paulo Freire, whose work emphasizes the power of education as a practice of freedom and social justice. The speculative methodology here calls for curricula that empower girls, deconstruct patriarchal values, and embrace diverse female experiences as central to the learning process.
- How might inclusive curricula serve as speculative sites for imagining social justice? This question is crucial in addressing the question of educational transformation. A truly inclusive curriculum should not just represent women and girls but also work as a transformative tool, allowing students to engage with critical feminist thought and build critical consciousness about the relationship between gender and education.

The speculative method encourages imagination—reframing education as a site where gender bias is actively confronted. It allows us to consider the possibilities for educational spaces that recognize and celebrate the full humanity of girls, providing them with empowering learning environments that offer the tools necessary for their academic, social, and personal growth.

Analytical Methodology: The analytical methodology entails a rigorous deconstruction of gendered educational content and a philosophical analysis of how gender biases are embedded within textbooks, classroom practices, and broader educational frameworks. The analytical process focuses on examining the philosophical foundations that sustain gendered education, focusing particularly on the linguistic, epistemological, and ontological dimensions of knowledge production.

Key elements of the analytical methodology include:

- Deconstructing gendered language in textbooks and syllabi. This analysis will investigate how language is used to create gendered identities and roles that limit girls' engagement with certain subjects. For instance, the study will critically examine how gender-neutral language can be incorporated into textbooks and other learning materials to break down barriers that perpetuate gendered knowledge.
- Evaluating the historical, cultural, and philosophical assumptions that sustain the perception that subjects like STEM are male-dominated. Drawing from Foucault's (1977) theory of power/knowledge, this methodology explores how knowledge systems in education have traditionally been constructed to favor male experiences, often excluding or marginalizing female contributions. The analysis will ask why certain subjects are seen as masculine and challenge the philosophical narratives that reinforce these divisions.

- Assessing the epistemological implications of gendered curricula: What knowledge is prioritized in the classroom, and whose knowledge is marginalized? The study will apply feminist epistemology to examine how knowledge is produced and valued in educational settings and how gender plays a role in legitimizing or delegitimizing certain forms of knowledge.

This analytical approach goes beyond content analysis; it critiques the underlying structures and philosophies that shape educational practices, proposing how they can be restructured to reflect gender equality.

Prescriptive Methodology: The prescriptive methodology of this study takes a normative approach, proposing practical solutions for reforming curricula and educational practices to achieve greater gender equity. Building on the analytical findings, this prescriptive methodology provides actionable steps for educators, policymakers, and curriculum designers to transform educational systems that perpetuate gender biases into systems that empower the girl child and support gender equality.

This prescriptive approach provides concrete, actionable strategies for transforming educational systems into spaces that are inclusive, empowering, and equitable for all students, particularly for the girl child. It shifts from theoretical critique to the practical implementation of gender-inclusive education.

Philosophical Foundations and Ethical Considerations

The study is grounded in the belief that education is a transformative tool for social justice, and the ethical framework guiding this research involves the moral responsibility to ensure that gender inequalities are dismantled in educational systems. This research is ethically committed to the advancement of gender equality by proposing reforms that align with the rights of all students to access an education that promotes equality, dignity, and empowerment.

In applying philosophical research methods, the study seeks to reimagine and reconstruct educational systems that reflect gender justice and serve as inclusive spaces where girls can thrive and develop their full potential as future leaders, scholars, and global citizens.

Analysis and Discussion

Content Analysis of Textbooks and Materials: The gendered nature of educational content is vividly demonstrated by the male-dominated narratives embedded in secondary school curricula, as evidenced in the findings of Mustapha (2014) and Zakka et al. (2015). Male figures dominate textbooks, particularly in history, science, and literature, where girls are either underrepresented or relegated to stereotypical roles. For instance, in history textbooks, the emphasis is largely on male political leaders,

explorers, and inventors, while women's contributions are either marginalized or presented in passive, secondary roles. Sadker and Sadker (1994) highlighted how this dominance reinforces the perception that men are the primary agents of societal change, while women's roles are often confined to the domestic sphere, diminishing their visibility and influence in public life.

In STEM subjects, where the gender gap is particularly glaring, textbooks overwhelmingly feature male scientists and engineers as the default experts, subtly reinforcing the idea that these fields are male-dominated. This omission of female role models like Marie Curie, Ada Lovelace, and Mae Jemison contributes to a cycle where girls may subconsciously believe these fields are not meant for them, thereby discouraging their academic participation in these areas. Collins (2000) emphasizes how educational content often functions as a tool for social reproduction, where dominant ideologies, including gender, are reinforced through curricula. This perpetuation of gendered knowledge through curriculum content serves to limit girls' academic potential and career aspirations, particularly in traditionally male-dominated fields.

Moreover, implicit gender bias in textbooks is also evident in language choices, such as the frequent use of male pronouns for generic figures. This subtle yet pervasive linguistic bias serves to position male experiences as the default, marginalizing the experiences of female students and reinforcing the notion that masculine perspectives are central in fields like math, engineering, and politics (Butler, 1990; Foucault, 1977). These gendered representations are not only evident in textbooks but also within the hidden curriculum, which subtly enforces gender norms through classroom interactions and content selection (Apple, 2000).

Implicit vs. Explicit Bias

The distinction between explicit and implicit biases in educational content provides critical insight into how gender disparities are perpetuated. Explicit biases, such as the exclusion of female figures in historical and scientific contexts, are easier to identify and address. However, the more pervasive issue lies in implicit bias—the subtler ways in which gender is embedded in educational materials. For example, textbooks that consistently use male pronouns or prioritize male achievements without challenging these defaults implicitly reinforce gender inequality (hooks, 1994). These implicit biases often go unnoticed, yet they shape students' perceptions of themselves and the world around them, particularly for girls, who may feel excluded or discouraged from pursuing certain academic fields. To address this, textbooks and other educational materials must undergo gender-sensitive revisions, incorporating female role models and highlighting the contributions of women across all subjects. Feminist pedagogy, as articulated by bell hooks (1994), calls for a transformative education that centers the experiences of

marginalized groups, particularly women, and actively disrupts these implicit gender biases in educational content.

Impact on Female Students: Disempowerment and Self-Concept

Psychological and Academic Impact: The psychological effects of a gendered curriculum are profound, particularly in how they influence girls' self-esteem, academic engagement, and career aspirations. Sadker and Sadker (1994) documented how girls in male-dominated subjects feel marginalized and alienated, leading to a decline in academic motivation. This aligns with Gilligan's (1982) ethics of care, which posits that girls often feel disconnected from curricula that do not reflect their own relational and emotional experiences. In the traditional educational model, which emphasizes competition and individualism—values typically associated with masculinity—girls may feel that their emotional intelligence and collaborative skills are undervalued, leading to a psychological sense of inferiority in fields like STEM that prioritize more abstract forms of reasoning.

Further, gendered pedagogical practices—where boys are often given more opportunities to speak, encouraged more actively, and rewarded for performance—create a self-reinforcing cycle of disempowerment for girls. Schunk (1991) highlights the role of self-efficacy in academic success, noting that girls who are repeatedly excluded or discouraged from engaging with certain subjects internalize these experiences, resulting in low self-confidence and academic disengagement. The exclusion of female role models in STEM fields further contributes to this issue, as girls do not see themselves reflected in the subjects they are expected to excel in, making them less likely to pursue careers in these fields.

Disempowerment in STEM: The gendered nature of STEM education contributes significantly to the disempowerment of girls. As Zakka et al. (2015) and Tau and Olawepo (2020) have demonstrated, girls are underrepresented in STEM subjects, with the gender gap widening as they progress through their academic careers. This underrepresentation can be linked to gendered expectations that STEM subjects are male-dominated. Studies have shown that when girls do not encounter female role models in STEM textbooks or curricula, they often feel that these fields are not open to them (Moss-Racusin et al., 2012). Furthermore, the lack of gender-sensitive teaching practices in STEM classrooms—where boys are more likely to be called upon and encouraged—reinforces the stereotype that math and science are more suited to boys (Sadker & Sadker, 1994). The gender gap in STEM thus represents a structural failure to provide equitable opportunities for girls in these crucial areas. The absence of female role models in STEM curricula leaves girls with limited visibility in these fields. Including figures like Marie Curie and Rosalind Franklin in science education not only provides inspiration for girls but also challenges the narrative that STEM fields are

inherently masculine. The curriculum must emphasize that science and engineering are not just male domains, but fields where both men and women have contributed equally, thus empowering girls to envision themselves in these careers.

Compounded Disadvantage

The intersectionality of gender, race, and class creates a compounded disadvantage for certain groups of girls, particularly those from marginalized communities. Crenshaw's (1989) theory of intersectionality is crucial in understanding how gendered curricula do not uniformly affect all girls. Girls of color, as well as low-income girls, face multiple layers of discrimination that intersect with gender bias, further marginalizing them in educational contexts. Mayer's (2005) work on race-gender stereotypes reveals how Black girls, in particular, face lower academic expectations due to both their race and gender. This intersection of gender and race leads to a unique set of barriers that compounds their educational disempowerment. This makes them more likely to be excluded from leadership roles and academic recognition. For instance, girls from rural areas or those from culturally conservative backgrounds often face additional socio-cultural barriers that prevent them from accessing education. Ethnic customs that prioritize early marriage or domestic responsibilities over schooling, especially for girls, contribute to high dropout rates in northern Nigeria and other regions. The intersectionality of gender, class, and cultural norms therefore necessitates intersectional curriculum reform that goes beyond addressing gender alone. The curriculum must reflect the experiences of girls of color, low-income girls, and those in rural or conflict-affected areas, ensuring that gender bias does not further exacerbate the challenges faced by these students.

Case Studies of Intersectionality

Global case studies illustrate how these compounded disadvantages play out in different cultural contexts. In Nigeria, Hausa and Fulani girls face unique challenges, such as early marriage and cultural norms that prioritize domestic responsibilities. These challenges intersect with gender bias in the curriculum, which fails to provide relatable role models or address the particular needs of marginalized girls. Educational reforms must be intersectional, incorporating both gender-sensitive content and specific cultural considerations to ensure that all girls, especially those facing multiple forms of discrimination, are empowered to succeed academically.

Teacher Expectations and Gendered Pedagogy

The presence of teacher bias—whether conscious or unconscious—plays a crucial role in perpetuating gender inequality in the classroom. Teachers' expectations influence not only who gets to speak or who is encouraged to engage with certain subjects but also who is praised for academic achievement. Sadker and Sadker (1994) found that teachers

are more likely to give attention and praise to male students, especially in STEM subjects. This reinforces the stereotype that boys are better suited for these subjects, while girls are subtly discouraged from participating. Moss-Racusin et al. (2012) further confirm that teacher biases directly affect girls' self-confidence in STEM fields, making them less likely to engage with the material and pursue careers in these fields. The curriculum's gendered pedagogy must be examined not only for content biases but also for classroom practices that reinforce gender roles. Teachers must be trained to recognize and address gender biases, ensuring that all students, regardless of gender, receive equal opportunities to participate and succeed in every subject.

Pedagogical Strategies for Gender Inclusivity

Pedagogical strategies rooted in feminist pedagogy offer critical insights for creating gender-inclusive classrooms. By focusing on gender-responsive teaching and empowering all students, these strategies challenge the gendered dynamics that dominate traditional classrooms. Teachers should be trained in gender-sensitive teaching methods, including the use of inclusive language and equal opportunities for participation. Feminist pedagogy encourages teachers to actively engage with the experiences of marginalized students, particularly girls, and ensure that the curriculum reflects gender equality (hooks, 1994).

Conclusion

This chapter critically examined the gendered nature of secondary school curricula and its role in the disempowerment of the girl child. Through the philosophical lens provided by thinkers such as John Dewey, Paulo Freire, and bell hooks, we explored the underlying power structures that perpetuate gender inequality within educational systems. Educational philosophy, when applied to gendered curricula, reveals how the knowledge produced and transmitted in schools is deeply intertwined with societal norms that favor male perspectives and marginalize female voices. The documentary analysis of textbooks and other educational materials underscored the pervasive gender bias embedded in curricula, where male figures dominate in areas such as history, science, and literature, while female contributions are minimized or omitted. This explicit bias, alongside implicit gendered assumptions in language and teaching practices, significantly affects the psychological and academic engagement of female students. As Sadker and Sadker (1994) and Moss-Racusin et al. (2012) have demonstrated, girls often feel alienated in subjects that are presented as male-dominated, leading to decreased self-esteem and academic agency. Furthermore, the intersectionality of gender with other identities such as race, class, and disability compounds the challenges faced by marginalized girls, as evidenced by the work of Crenshaw (1989).

The impact of teacher bias on female students' engagement in STEM subjects, as well as the broader pedagogical practices that favor male students, was also thoroughly discussed. Research shows that even well-intentioned teachers often unconsciously reinforce gender stereotypes, particularly in STEM classrooms, which hinders girls' participation and achievement. The gendered pedagogy prevalent in educational systems must be transformed to create a more inclusive learning environment for girls, where they feel empowered to engage in all areas of study, including those traditionally dominated by males. To address these persistent inequalities, the study proposes gender-inclusive curriculum reforms, teacher training programs, and the integration of female role models across all disciplines. The prescriptive methodology outlined in this study offers practical solutions aimed at dismantling the gendered structures within education, which not only restrict girls' academic potential but also perpetuate gendered stereotypes that limit their future opportunities.

In summary, the need for a holistic and intersectional approach to curriculum reform that recognizes the unique challenges faced by marginalized girls has been emphasized. Drawing on the ethical principles of social justice, this research advocates for systemic changes that will ensure equitable education for all students, empowering the girl child to fully realize her potential in all fields of knowledge. The transformation of education into a space of gender equality is not just an academic goal, but a moral imperative that will benefit society as a whole, fostering a more just, inclusive, and progressive world for future generations.

Recommendations for Reforming Gendered Curricula

Based on the issues discussed in this chapter, the following recommendations were made:

- **Incorporation of Female Role Models Across Disciplines:** Textbooks and curricula should include female role models in all subjects, particularly in STEM fields (science, technology, engineering, and mathematics). The omission of influential women like Marie Curie and Mae Jemison in science and Ada Lovelace in mathematics perpetuates the stereotype that these fields are primarily male-dominated. Ensuring that female contributions are equally represented alongside male achievements will inspire girls to pursue these disciplines and enhance their academic self-concept (Sadker & Sadker, 1994).
- **There is the need for Gender-Sensitive Teacher Training Programmes:** Teachers must undergo gender-sensitivity training to help recognize and address their unconscious biases. Such training would involve examining how classroom interactions—such as gendered expectations or teacher favoritism—can affect girls' participation in male-dominated subjects. Training should also focus on how to create inclusive learning environments where girls are equally

encouraged to participate in all subjects, including traditionally male-dominated ones like mathematics and science (Sadker & Sadker, 1994).

- **Revision of Curricula Content to Challenge Gender Norms:** Curricula should be revised to challenge gender norms by ensuring that both genders are represented equitably across all subjects. For example, history lessons should include more emphasis on the contributions of female historical figures, such as Funmilayo Ransome-Kuti and Wangari Maathai, while literature classes should feature female authors such as Buchi Emecheta alongside their male counterparts. This approach will challenge traditional gender roles and help normalize female participation in all sectors of society (hooks, 1994).
- **Introduction of Intersectional Curriculum Reforms:** The interconnectedness of gender, race, class, and ethnicity—must be considered when reforming curricula. Girls of color and low-income girls face compounded challenges in accessing quality education. Curriculum reforms should reflect these complexities and offer inclusive content that accounts for the lived experiences of marginalized girls. For instance, Hausa, Fulani, and other marginalized ethnic groups should see their cultural histories and role models represented in curricula, ensuring that gender bias is not compounded by ethnic and class biases (Crenshaw, 1989).
- **Integration of Feminist Pedagogy in Teacher Education:** Feminist pedagogy should be integrated into teacher education programs to equip educators with the tools to foster gender-inclusive learning environments. Teachers should be trained to deconstruct gender stereotypes, use gender-neutral language, and encourage equal participation from both boys and girls in all subjects. This pedagogical shift will promote an equitable classroom environment that challenges traditional gender norms and empowers girls to engage fully in all areas of study (Hooks, 1994).
- **Promotion of Policy Reforms to Address Structural Inequities:** Policy reforms at the institutional and national levels should aim to address structural inequities in education. These reforms should include the development of gender-sensitive educational infrastructure, such as safe and private spaces for girls, particularly in rural areas, to manage menstrual hygiene. Additionally, policies should support mentorship programs for girls pursuing non-traditional subjects and incentive-based programs that encourage female participation in STEM fields. Policy changes should also advocate for gender-neutral admissions policies and equal representation of female faculty members in STEM departments.

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CHAPTER TWELVE

ICT-BASED INSTRUCTIONAL DELIVERY IN SECONDARY SCHOOLS: ROLES OF TEACHERS IN SUSTAINABLE DEVELOPMENT IN BIASE LOCAL GOVERNMENT AREA OF CROSS RIVER, NIGERIA

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Introduction

In the era of globalization and technological advancement, education systems around the world are undergoing a fundamental transformation. One of the most notable drivers of this transformation is the integration of Information and Communication Technology (ICT) into teaching and learning. The role of ICT in education goes beyond administrative convenience or instructional support; it now serves as a strategic tool for achieving quality education and advancing the broader goals of sustainable development, particularly as outlined in Sustainable Development Goal 4 (SDG 4): “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (UNESCO 2015). Simin, Wan and Wan, in Uwabunkeonye (2023) opined that, many developing countries, including Nigeria, efforts have been made to equip secondary schools with ICT infrastructure such as computers, internet access, multimedia tools, and digital learning platforms. These initiatives are often supported by education reforms and development agenda aimed at modernizing the teaching and learning process and making it more relevant to 21st-century needs.

Ahamefula (2021) Stated, despite these efforts, the effective implementation of ICT-based instruction remains inconsistent and largely dependent on the readiness, skills, and commitment of teachers who are the direct facilitators of educational content delivery. Teachers play multifaceted roles in ICT integration. They act not only as instructors but also as mentors, curriculum designers, digital content developers, and agents of change in fostering innovation and sustainability in schools (Martains 2020). He further stated that when properly empowered, teachers can use ICT tools to improve students’ engagement, personalize instruction, encourage collaborative learning, and promote critical thinking skills essential for sustainable development in the modern world. However, challenges such as lack of training, inadequate infrastructure, poor maintenance culture, and policy gaps continue to hinder the potential of ICT-based instruction in many secondary schools (Pelgrum in Okereke, 2022). Furthermore, Ejeh

(2018) pointed that, there is a growing recognition that sustainable development is not just an economic or environmental issue; it is also deeply rooted in how people are educated. She further opined that Teachers using ICT effectively can help students develop the digital literacy and problem-solving competencies required for active participation in sustainable societies.

According to the United Nations (2015), sustainable development calls for concerted efforts toward building an inclusive, sustainable and resilient future for people and the planet, they further stated that Sustainable development involves improving the quality of human life while living within the carrying capacity of supporting ecosystems. Teachers advocate for policy reforms that promote sustainability in education systems and support national/international sustainability agendas. (UNESCO, 2005). Teachers engage in continuous professional development to stay updated on sustainability education trends, tools, and research. (OECD, 2018). Tilbury, (2002) is of the view that teachers influence students' attitudes and behaviors by modeling sustainable practices in their personal and professional lives. The success of instructional transformation, therefore, hinges on how well teachers understand and embrace their roles in delivering ICT-based education. Given this context, the present study investigates the level of ICT-based instructional delivery in secondary schools and examines the crucial roles teachers play in linking technology use to sustainable educational outcomes. By doing so, the study aims to offer empirical insights that will guide policymakers, educators, and stakeholders in enhancing teacher capacity and institutional support for ICT in schools. Despite investments in ICT infrastructure, many secondary schools in Biase Local Government in Cross River State struggle with poor implementation. Teachers face barriers including inadequate training, lack of technical support, and resistance to change. This study seeks to empirically assess how teachers contribute to sustainable development through ICT based instructional delivery.

Purpose of the Study

The purpose of this study is to find out:

1. The influence of ICT based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria.
2. The influence of teachers' knowledge and skills in ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria.

3. Research Questions

4. To what extent does ICT based instructional delivery influence the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria?

5. To what extent does teachers' knowledge and skills in ICT based instructional delivery influence the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria?

Hypotheses

H₀₁: There is no significant influence of ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria.

H₀₂: There is no significant influence of teachers' knowledge in ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria.

Research Design

This study adopted descriptive survey. This design was appropriate as the study aimed to get information on ICT Based Instructional Delivery in Secondary Schools: Roles of Teachers in Sustainable Development in Biase Local Government Area of Cross River, Nigeria. There are 17 Secondary Schools owned by Government in Biase Local Government area. Source: Biase Local Government Education Authority, Akpet Central (July, 2025). The population of this study consists of 980 teachers in public secondary schools in Biase L.G.A of Cross River State. The sample for this study was three hundred and twelve (312) respondents drawn from the area of study using proportionate and stratified random sampling technique. Questionnaire was used as instrument for data collection in the study. The questionnaire titled, "ICT Based Instructional Delivery and Sustainable Development Questionnaire, (IBIDSDDQ) was developed by the researcher. The instrument was designed to collect information on ICT Based Instructional Delivery in Secondary Schools and the Roles of Teachers in Sustainable Development in Biase local government area of Cross River, Nigeria. The instrument has 18 items: ICT based instructional delivery was measured with 4 items, Teachers' knowledge of ICT-based instructional delivery has 7 items while the role of teachers in sustainable development contained 7 items. The instruments were designed on a four point rating scale of Strongly Agree (SA), Agree (a), Disagree (D) and Strongly Disagree (SD). The instrument was duly face and content validated by 2 experts in the departments of computer science and educational foundations of University of Calabar, Calabar. To ascertain the reliability of the instrument, a trial test was carried out on equivalent population 98 respondents in Akamkpa Local Government Area. The data obtained was analysed using Cronbach Alpha Reliability Estimates and the coefficients obtained ranged from .89 to .92.

The 312 questionnaire was administered by the researcher with the assistance of two research assistants, out of which 310(99.3%) were used for data analysis while 2(0.7%)

were discarded because of wrong filling. These research assistants were trained on the method of administering and retrieving the instruments. Direct delivery and retrieval system was used. This helped the researcher to recover all the instruments from the respondents. The data was analyzed using one-way analysis of variance and simple linear regression analysis at .05 level of significance.

Results

Hypothesis one: There is no significant influence of ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria. To test this hypothesis, One-way Analysis of Variance (ANOVA) was applied with ICT-based instructional delivery as independent variable or factor and the role of teachers in sustainable development as dependent variable. The f-ratio was used to test the overall influence and Fishers Least Significant Difference (LSD) test to compare pairs of means as post hoc test. The ANOVA results are presented on Table 1.

Table 1: One-way ANOVA of ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria

ICT-based instructional delivery	N	Mean	Std dev.			
Computer	68	22.8382	2.69111			
Projector	82	21.5976	3.80986			
Digital whiteboard	98	22.7551	2.66733			
Audio-visual	62	23.1452	3.90396			
Total	310	22.5452	3.31070			

Source of variation	Sum of squares	Df	Mean square	F – value	P – value
Between groups	106.112	3	35.371	3.299*	.021
Within groups	3280.756	306	10.721		
Total	3386.868	309			

*Significant at .05 level, $P < .05$

From Table 1, the mean showed that audio-visual based instructional delivery was the best for the role of teachers in attainment of sustainable development in Biase Local Government Area of Cross River, Nigeria ($X=23.1452$), followed by computer based instructional delivery ($X=22.8382$) while the least was projector based instructional delivery ($X=12.189$). The result of the ANOVA output in the model showed that the p-value (.021) associated with the computed F-value (3.299) was observed to be less than .05. Hence, the null hypothesis was rejected. This means that there is significant influence of ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria. To find out which pair of means was responsible for the observed significant results, Fisher's LSD test was carried out. The results are presented in Table 2.

Table 2: Fishers LSD Pairwise comparison of influence of ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria

(I) ICT Based instruction	(J) ICT based instruction	Mean Difference	Std error.	P-value
Computer	Projector	1.24067*	.53704	.022
	Digital whiteboard	-.08313	.51679	.872
	Audio-visual	-.30693	.57497	.594
Projector	Computer	-1.24067*	.53704	.022
	Digital whiteboard	-1.15754*	.49005	.019
	Audio-visual	-1.54760*	.55107	.005
Digital whiteboard	Computer	-.08313	.51679	.872
	Projector	1.15754*	.49005	.019
	Audio-visual	-.39006	.53135	.463
Audio-visual	Computer	.30693	.57497	.594
	Projector	1.54760*	.55107	.005
	Digital whiteboard	.39006	.53135	.463

*The mean difference is significant at .05 level

The results on Table 2 showed that the mean (\bar{x}) of computer based instructional delivery was significantly different from projector based instructional delivery ($MD = 1.24067$, $P = .022 < .05$). Projector based instructional delivery was significantly different from computer based instructional delivery ($MD = -1.24067$, $P = .022 < .05$), digital whiteboard based instructional delivery ($MD = -1.15754$, $P = .019 < .05$), and audio-visual based instructional delivery ($MD = -1.54760$, $P = .005 < .05$).

Digital whiteboard based instructional delivery was significantly different from projector based instructional delivery ($MD = -1.15754$, $P = .019 < .05$). Audio-visual based instructional delivery was significantly different from projector based instructional delivery ($MD = 1.54760$, $P = .005 < .05$) while other pairwise were not significantly different.

Hypothesis two: There is no significant influence of teachers' knowledge in ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria. To test this hypothesis, simple linear regression analysis was used with teachers' knowledge in ICT-based instructional delivery as independent variable and the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria as dependent variable. The f-ratio was used to test the overall significant influence. The results are presented in Table 3. The results in Table 3 showed a regression coefficient (R) of .156 and a coefficient of determination (R^2) of .024. This means that about 2.4% of the total variation in the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria was attributed to the variation in teachers' knowledge in ICT-based instructional delivery while 97.6% was attributed to other extraneous variables not considered in this study. The result of analysis of variance in the regression output produced the computed F-

value of 7.662 ($p < .05$) which is statistically significant at .05 probability level with 1:308 degrees of freedom. As a result, the null hypothesis was rejected. This means that there is significant influence of teachers' knowledge in ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria.

The result of the regression weights of the predictor variable (teachers' knowledge in ICT-based instructional delivery) in Table 3 showed positive coefficients ($B = .240$ and $Beta = .156$). This indicated that teachers' knowledge in ICT-based instructional delivery has a low positive influence on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria and a unit increase in teachers' knowledge in ICT-based instructional delivery will lead to more than a unit improvement in the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria. Furthermore, the P-values (.000 & .006) associated with the computed t-values (16.315 & 2.768) for the regression constant and teachers' knowledge in ICT-based instructional delivery are less than .05. This means that both the regression constant and teachers' knowledge in ICT-based instructional delivery made significant positive contributions to the prediction of the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria. The regression equation is: $y = 19.310 + .240x$

TABLE 3: Regression analysis of influence of teachers' knowledge in ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area of Cross River, Nigeria

R – value = .156 R – square = .024		Adj R – square = .021 Std. Error = 2.27558			
Source of variation	Sum of squares	Df	Mean square	F– value	P – value
Regression	82.213	1	82.213	7.662*	.006
Residual	3304.654	308	10.729		
Total	3386.868	309			

Predictor variable	Unstandardised coeff B	Std. Error	Std coeff Beta	t-value	P – value
Constant	19.310	1.184		16.315*	.000
Teachers' know. in ICT-based instruct. delivery	.240	.087	.156	2.768*	.006

*Significant at .05 level, $P < .05$

Discussion of findings

The study's first finding that ICT-based instructional delivery has a significant influence on the role of teachers in sustainable development in Biase Local Government Area of Cross River State, Nigeria, is a compelling indication of the transformative potential of technology in education. By harnessing the power of Information and Communication Technology (ICT), instructional delivery can be revolutionized, leading to improved learning outcomes, increased access to information, and enhanced skills development. The integration of ICT in education can have far-reaching implications for sustainable development in the region. For one, it can equip students with the digital literacy skills necessary to thrive in an increasingly technology-driven world. This, in turn, can open up new opportunities for economic empowerment, entrepreneurship, and innovation. Moreover, ICT-based instruction can facilitate access to vital information and knowledge, bridging geographical and socio-economic divides and promoting informed decision-making.

The significant influence of ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area can also be attributed to its potential to enhance community engagement and participation. By leveraging ICT, educational institutions can reach a wider audience, foster collaboration, and promote a sense of ownership and responsibility among community members. This can lead to more effective development initiatives, better tailored to the needs and aspirations of the local population. Furthermore, the study's findings highlight the importance of investing in ICT infrastructure and capacity building in the region. By providing educators and community members with the necessary skills and resources, ICT-based instructional delivery can be optimized, leading to more sustainable and equitable development outcomes. These results are in agreement with Simin, Wan and Wan, in uwabunkeonye (2023) who opined that, many developing countries, including Nigeria, efforts have been made to equip secondary schools with ICT infrastructure such as computers, internet access, multimedia tools, and digital learning platforms. These initiatives are often supported by education reforms and development agenda aimed at modernizing the teaching and learning process and making it more relevant to 21st-century needs.

Overall, the study's results underscore the critical role that ICT-based instructional delivery can play in driving sustainable development in Biase Local Government Area. As the region continues to evolve and grow, it is essential that policymakers, educators, and community leaders prioritize the integration of ICT in education, harnessing its potential to create a more prosperous, equitable, and sustainable future for all. Similarly, the second finding that teachers' knowledge in ICT-based instructional delivery has a significant influence on the role of teachers in sustainable development in Biase Local Government Area of Cross River State, Nigeria, highlights the critical role that educators play in shaping the future of their students and communities. When teachers possess the

knowledge and skills to effectively integrate Information and Communication Technology (ICT) into their instructional delivery, they can unlock a wealth of opportunities for sustainable development. By leveraging ICT, teachers can create engaging, interactive, and student-centered learning experiences that foster critical thinking, problem-solving, and collaboration. This, in turn, can equip students with the skills, knowledge, and competencies necessary to contribute to sustainable development in their communities. Teachers who are knowledgeable in ICT-based instructional delivery can also facilitate access to a vast array of educational resources, bridging the gap between rural and urban areas, and promoting more equitable access to quality education.

The significant influence of teachers' knowledge in ICT-based instructional delivery on the role of teachers in sustainable development in Biase Local Government Area underscores the importance of teacher training and capacity building. By investing in professional development programs that focus on ICT integration, educators can stay up-to-date with the latest technologies and pedagogies, ensuring that their students receive the best possible education. This, in turn, can have a ripple effect, contributing to the development of a more skilled, informed, and engaged citizenry. Moreover, the study's findings suggest that teachers' knowledge in ICT-based instructional delivery can have a lasting impact on students' ability to navigate the complexities of the 21st century. As technology continues to evolve and shape the world, educators who are adept at using ICT can empower their students to become active participants in the digital economy, rather than mere spectators. This finding corroborates the submission of Martains (2020) that when properly empowered, teachers can use ICT tools to improve students' engagement, personalize instruction, encourage collaborative learning, and promote critical thinking skills which are essential for sustainable development in the modern world. Furthermore, Ejeh (2018) pointed that teachers using ICT effectively can help students develop the digital literacy and problem-solving competencies required for active participation in sustainable societies. Ahamefula (2021) Stated, teachers play multifaceted roles in ICT integration. They act not only as instructors but also as mentors, curriculum designers, digital content developers, and agents of change in fostering innovation and sustainability in schools.

In a nutshell, the study's results emphasize the need for policymakers and educational administrators to prioritize teacher training and capacity building in ICT-based instructional delivery. By doing so, they can unlock the full potential of ICT to drive sustainable development in Biase Local Government Area, and equip students with the skills, knowledge, and competencies necessary to thrive in an increasingly complex and interconnected world.

Conclusion

The study's results demonstrate that ICT-based instructional delivery and teachers' knowledge in ICT have a significant influence on the role of teachers in sustainable development in Biase Local Government Area of Cross River State, Nigeria. These findings underscore the critical role that technology and education can play in driving sustainable development, and highlight the need for investments in ICT infrastructure, teacher training, and capacity building. To harness the potential of ICT for sustainable development, it is essential that policymakers, educators, and stakeholders prioritize the integration of ICT in education, and provide teachers with the necessary skills and resources to effectively use technology in their instructional delivery. By doing so, they can empower students with the knowledge, skills, and competencies necessary to contribute to sustainable development, and equip them to thrive in an increasingly complex and interconnected world. Ultimately, the study's findings suggest that ICT-based instructional delivery and teacher knowledge in ICT are essential components of a sustainable development strategy that seeks to promote economic growth, social equity, and environmental sustainability. As such, they should be prioritized in educational planning and policy-making, and supported with adequate resources and infrastructure.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Integration of ICT into teaching: Teachers in Biase Local Government Area should prioritize the integration of ICT into their teaching, ensuring that students have access to ICT-based instructional delivery. This can be achieved by developing ICT-enabled lesson plans, providing students with access to digital resources, and incorporating ICT-based assessments.
2. Continuous teacher training and capacity building: Educational authorities in Biase Local Government Area should provide regular training and capacity-building programmes for teachers to enhance their knowledge and skills in ICT-based instructional delivery. This can include workshops, seminars, and online courses that focus on effective ICT integration, digital pedagogy, and innovative teaching methods.

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CHAPTER THIRTEEN

RETHINKING AND IMPROVING MONITORING AND EVALUATION IN NIGERIAN EDUCATION

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Introduction

Education is widely regarded as the bedrock of national development; however no education system could lead to national development automatically. For any education system to yield desired results there should be a well-thought out process coupled with consistency and commitment to addressing challenges especially in the twenty-first century knowledge-driven economy and exponential growth in information and communication technology (ICT) (Bichene & Ogba, 2021; .Idika, Orji, Bichene, & Oke, 2022). Nigeria's education system faces urgent, interlocking problems: large numbers of out-of-school children (Orji & Bichene, 2025), persistent learning gaps, assessment irregularities and examination malpractices (Anagbogu & Bichene, 2024), wide subnational inequalities, issues of corruption and fiscal constraints (Bichene & Ebuta, 2019a) that demand better returns on investment. These realities make robust monitoring and evaluation (M&E) no longer optional but central to policy, budgeting and service delivery. Monitoring and Evaluation (M&E) are critical components of effective educational system and policy implementation. They serve as the backbone for assessing the efficiency, equity, and impact of educational policies and interventions (Federal Ministry of Education, 2020). However, despite various reforms and development frameworks, weaknesses persist in data reliability, stakeholder participation, and feedback utilization. A case in hand is the 2022/2023 National Personnel Audit which revealed inconsistencies in data reporting across several states, highlighting the need for more robust M&E systems (Universal Basic Education Commission, 2024).

This chapter examines the role of M&E in Nigeria's education system, proposing innovative, data-driven, and inclusive strategies to improve quality assurance, learning outcomes, and accountability in the education sector.

Conceptualization of Monitoring and Evaluation

Monitoring refers to the continuous process of collecting and analyzing information to track progress towards planned results, while evaluation involves systematic assessment of a programme’s design, implementation, and outcomes (Bamberger, Rugh, & Mabry, 2019). Together, therefore, monitoring and evaluation should provide a comprehensive understanding of how educational inputs translate into desired learning outcomes. An effective M&E system in education should integrate data collection, analysis, and reporting mechanisms that inform timely decision-making (UNICEF et al., 2022). In Nigeria, the introduction of the National Education Management Information System (NEMIS) and the Education Data Portal represents major steps towards data centralization and transparency (State House, 2024). However, challenges such as fragmented reporting, inadequate funding, and limited technical capacity hinder full operationalization. The M&E conceptual framework should link educational programmes model with information feedback mechanisms, thereby promoting performance management, accountability, and learning.

Figure 1: Conceptual framework

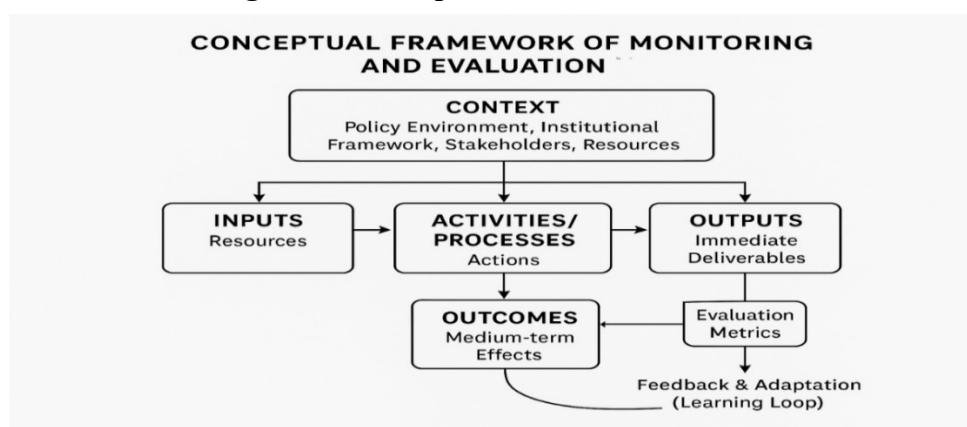


Table 1: Components of the conceptual framework

Component	Description	Purpose
Inputs	Resources invested in the education program (funds, personnel, materials, time, etc.)	To support planned education activities
Activities/ Processes	Actions carried out to achieve educational objectives (training, sensitization, data collection, etc.)	To transform inputs into outputs
Outputs	Immediate deliverables from activities (trained teachers, distributed materials, workshops held)	To produce measurable short-term results
Outcomes	Medium-term effects (improved skills, behaviour change, enhanced institutional capacity)	To demonstrate program effectiveness
Impacts	Long-term changes (improved educational quality, reduced poverty, enhanced well-being)	To show achievement of overall goals
Indicators	Quantitative or qualitative measures used to assess progress	To provide evidence for decision-making

Assumptions and Risks	External conditions that may influence results	To identify and mitigate potential barriers
Feedback and Learning Loops	Mechanisms for adjusting activities based on evidence	To ensure adaptive management and sustainability

Theoretical Basis

The above framework is anchored on two complementary approaches; the Theory of Change (ToC) and Results-Based Management (RBM); which together provide a logical and evidence-driven foundation for programme design, implementation, monitoring, and learning. The theory of change offers an explicit explanation of how and why specific education interventions are expected to lead to the desired outcomes. It maps the causal pathways linking inputs, activities, outputs, and outcomes, while articulating the underlying assumptions, contextual conditions, and mechanisms of change. A well-developed ToC functions both as a product; a visual and narrative model of expected change and as a process of collaborative reflection and evidence testing among stakeholders (INTRAC, 2024; UNSDG, 2023). By identifying critical assumptions and contextual factors, the ToC helps decision-makers identify where to focus monitoring efforts and what risks to mitigate to achieve expected educational goals.

On the other hand, Results-Based Management operationalizes the ToC by translating the causal logic into a measurable results framework comprising indicators, baselines, and targets (OECD, 2024; World Bank, 2022). The implication here is that RBM emphasizes performance measurement, accountability, and adaptive learning across all stages of the education programme cycle in Nigeria; from planning and budgeting to implementation and evaluation. It suggests therefore, that management decisions are driven by data on results rather than by activities alone. Recent UN and World Bank guidance stresses that RBM is most effective when feedback loops are established to enable timely course corrections, thereby transforming monitoring data into actionable insights (UNSDG, 2022; WHO, 2023), something that can be valuable in the Nigerian educational system.

The integration of ToC and RBM into Nigerian education monitoring and evaluation (M&E) activities could strengthen education programmes coherence and accountability in the country. This is because the ToC clarifies *why* education interventions are expected to work, while RBM specifies *what* to measure and *how* to assess progress in the country's education system. Together, they promote a culture of continuous learning, encourage evidence-based decision-making, and ensure that monitoring and evaluation systems remain adaptive to changing contexts. This combined framework also mitigates the common weaknesses of each approach: the

ToC's tendency toward abstraction is balanced by RBM's focus on measurable indicators, and RBM's potential rigidity is offset by the ToC's iterative learning process. To this end, the ToC-RBM synthesis offers a dynamic, results-oriented framework well suited to contemporary developments and implementation of education programmes in Nigeria's complex environments.

Current status of Monitoring and Evaluation in Nigeria's education sector

The FME, UBEC, and other parastatals have institutionalized M&E frameworks aimed at ensuring accountability and continuous improvement (FME, 2025). Nonetheless, implementation remains inconsistent across states. UBEC's 2022 Annual Report (UBEC, 2023) revealed disparities in data quality and delayed reporting cycles in several education zones. Efforts are underway to improve the accuracy of school-level data through digital platforms and community-based validation mechanisms (UNICEF, 2023). For instance, the Federal Government's 2024 policy directive mandating real-time school data uploads through NEMIS is a landmark reform toward evidence-based decision-making (State House, 2024). Despite these advancements, M&E practices often suffer from political interference, inadequate training of field officers, and weak coordination between federal, state and local government actors (World Bank, 2025).

Challenges in Educational Monitoring and Evaluation

1. **Data quality and accessibility:** Data inaccuracies remain prevalent due to poor infrastructure and manual record-keeping. The 2022 National Personnel Audit exposed discrepancies between school enrolment figures and actual attendance (UBEC, 2024).
2. **Limited funding:** Budgetary allocation for M&E remains insufficient, with most states allocating less than 2% of their education budgets to monitoring and data management (World Bank, 2024).
3. **Capacity constraints:** Many education officers lack training in modern data analytics, visualization tools, and digital reporting systems (UNICEF et al., 2022).
4. **Lack of inclusivity:** Students with disabilities and marginalized groups are often excluded from monitoring frameworks due to limited disaggregated data (National Commission for Persons with Disabilities, 2023).
5. **Weak feedback mechanisms:** M&E findings are rarely translated into actionable policy recommendations or disseminated widely for stakeholder engagement (UBEC, 2023).

Innovative Approaches to Strengthen Monitoring & Evaluation (M&E) in Nigeria Education

Digital transformation and real-time data systems: The use of Digital tools such as cloud dashboards, mobile data collection apps, interoperable education management information systems (EMIS), and GIS/spatial platforms have moved M&E from periodic, paper-based reporting to near real-time evidence for decision making. Real-time systems allow program managers to detect implementation bottlenecks (e.g., low teacher attendance, stockouts of learning materials) within days instead of months, enabling corrective actions during the same implementation cycle. UNICEF's real-time data initiatives and digital-transformation efforts document how integrated digital pipelines (mobile collection → cloud storage → dashboards + alerts) support rapid, risk-informed responses in the monitoring and evaluation exercise.

Illustration (simple flow): Inputs (mobile forms, tablets) → Data capture (field) → Cloud ETL (validation & cleaning) → Dashboard + automated alerts → Managers adapt activities.

Practical actions: The 2024 federal pronouncement establishing a national education data system is a major step toward national-level digital M&E platforms that can integrate EMIS, assessment results, and sector monitoring. That policy-level action if followed with utmost commitment, provides the institutional pathway to scale real-time dashboards and data sharing across ministries and states as well as shorter reporting cycles and faster corrective action and better accuracy (validation rules on entry) and richer data (multimedia, GPS).

However, there could be challenges of data quality governance, privacy, and interoperability across legacy systems at federal, state and local governments and issues of connectivity and device gaps at local levels (rural schools). But these could be mitigated by adopting open standards (e.g., CSV/JSON exports, API-first EMIS) and a national master data policy, starting with a high-value pilot (e.g., teacher attendance + learning outcomes) and scale iteratively and investing in offline-capable mobile tools and routine data-quality audits nationwide.

Capacity building and professionalization: Digital systems work better if people can use and interpret the data. Professionalizing M&E involves creating career paths, job classifications, certification and continuous professional development (CPD) programmes for M&E officers and data analysts in the Nigerian education sector. The World Bank's technical guidance for education M&E stresses designing training that links measurement methods to program design and decision points. In Nigeria, education

ministries should formalize roles and partner with universities and training agencies to enhance Professionalization of M&E.

Illustration (capacity ladder): Data Collector → Data Officer (local governments) → M&E Specialist (states) → M&E Director (federal) — each level with defined competencies and certification.

Practical actions: Nigeria federal ministry of education (FME) could take the lead in developing a national M&E competency framework and a recognized certification (short course + practicum) for education M&E professionals. Include M&E modules into teacher education and public-administration curricula so school supervisors understand and use data (FME has previously published guidance and newsletters signaling the need for better staff capacity), however the level of commitment towards actualizing such noble objectives has to be scaled up. Though there could be challenges such as brain drain of trained M&E staff to NGOs/consultancies as well as funding for sustained in-service training. But these challenges could be mitigated by creating bonded continuous professional development (CPD) pathways linked to staff promotion and remuneration in the education sector.

Inclusive and participatory M&E: Inclusivity requires collecting disaggregated data (gender, disability, SES, location) and designing evaluation questions that surface differential outcomes. Making data disaggregation routine increases policy responsiveness, for example, adapting assessments and accommodations for learners with disabilities. The National Commission for Persons With Disabilities (NCPWD) and collaborative efforts with the National Population Commission (NPC) have highlighted the need to close disability-data gaps; the West African Examination Council (WAEC) recent plans to revamp assessments for candidates with special needs are a practical instance where inclusive measurement drives policy and operational change.

Illustration (disaggregation matrix):

Table 2: disaggregation matrix

Indicator	Total	Male	Female	Disability	Rural	Urban
Enrollment rate	84%	86%	82%	45%	78%	90%

Practical actions: WAEC's reform to consider special-needs candidates in assessment design (as announced in Dec. 2024) shows how inclusive M&E (assessment + accommodation) can change service delivery and support planning for assistive resources and so managers of Nigeria's education sector should key into that noble plan,

Although there could be pockets of challenges such as small population groups (e.g., particular disabilities) which could lead to low-sample sizes; requiring specialized sampling or qualitative follow-ups as well as additional costs for disaggregated data collection (assistive survey tools, enumerator training), etc. In which case we recommend prioritizing a small set of core disaggregated indicators for routine reporting and use of mixed methods where sample sizes are small as well as integration of disability questions into national household and school-based surveys using internationally aligned tools.

Community-based monitoring: Community-based monitoring (CBM) will involve engaging parents, PTAs, school committees and civil society in data validation and local accountability. CBM improves data credibility (local verification of attendance, infrastructure status) and fosters ownership which increases the likelihood that corrective actions are sustained within the Nigerian school system. For instance, UBEC’s teacher development and support documents emphasize supporting states and local governments with assessment and monitoring tools and training for local staff, which is an enabling environment for CBM.

Illustration (CBM cycle): Local data collection (school logbooks / community scorecards) → Community validation meeting → Prioritized actions → Local monitoring of fixes → Feedback to local government/state M&E.

Practical actions; simple, low-tech tools (school scorecards, SMS reporting lines) augment national EMIS by feeding verified local information; community monitors can validate whether textbooks were delivered and whether teachers attended scheduled training.

There may be challenges such as risk of politicization or elite capture of community processes and need to align community indicators with national EMIS definitions to avoid mixed messages. However, we recommend standardize community scorecards and training for citizen monitors; include data-quality checks and anonymized reporting channels to reduce political interference and integrate community data streams into dashboards as a labeled “verified/CBM” layer.

Integration with broader development agendas (SDGs & human capital): M&E must not operate in isolation, aligning education M&E with sustainable development goal (SDG 4), national human capital indices, and poverty/health monitoring ensures that education outcomes feed into macro planning and cross-sector investments. World Bank program documents and national education strategies increasingly stress results-based M&E that links sector outputs to human capital outcomes, enabling donors and governments to trace education investments’ contributions to wider socioeconomic growth.

Illustration (alignment map): Education indicator → SDG target mapping → Human capital index → Macro policy lever (budget, social protection)

Practical actions: When basic-education learning-outcome improvements are explicitly mapped to a national human capital roadmap, ministries of education can justify budget increases tied to measurable economic returns (e.g., projected gains in labor productivity).

Challenges here may be in areas where different sectors use different indicators and periodicities (health surveys vs. school EMIS), causing integration frictions and the fact that demonstrating that education investments directly produced macro gains requires longitudinal data and robust evaluation designs. In which case we recommend defining a small set of cross-sector “contribution indicators” that are regularly reported to the national planning agency or Federal Ministry of education (e.g., literacy rate age 10–14, net primary completion), as well as using pooled data platforms or national dashboards that allow policymakers to view education metrics alongside health, labor indicators and other indicators.

Policy Recommendations

1. **Institutionalize M&E units:** Every education ministry, agency and school in Nigeria should have a functional M&E unit with dedicated staff and resources.
2. **Increase funding:** At least 5% of education budgets should be allocated to M&E activities (World Bank, 2024).
3. **Develop a national M&E framework:** This should unify data standards, indicators, and timelines across all tiers of education in Nigeria (FME, 2025).
4. **Leverage technology:** Introduce digital reporting platforms linked to NEMIS to enable data-driven planning and monitoring.
5. **Enhance transparency:** Publish annual education performance scorecards in different states to promote accountability.
6. **Foster inclusion:** Ensure that all M&E tools capture data on marginalized groups (NCPWD, 2023).

Conclusion

Monitoring and evaluation are indispensable tools for driving educational quality, equity, and accountability in Nigeria. While notable reforms have been introduced, the persistent challenges of data integrity, capacity limitations, and exclusion call for renewed commitment to innovation and inclusivity. Rethinking M&E through digital transformation, participatory approaches, and strong policy frameworks will enable Nigeria to build a responsive and transparent education system that supports lifelong learning for all (UBEC, 2024; World Bank, 2025).

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CHAPTER FOURTEEN

EFFECTIVE IMPLEMENTATION OF MONITORING AND EVALUATION POLICIES FOR IMPROVED EDUCATIONAL OUTCOMES

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Introduction

Teaching and learning is a major component of the education system globally. At every point in time, progress in terms of inputs and output in the system requires periodic monitoring and evaluation in ascertaining whether real attainment in the field is achieved. The education system is one indicator that can be used in measuring the national development of societies; economic, social, political, technological and so on and it is a necessary mechanism for national building (Mensah 2019). The process of learning and teaching can be made efficient where there are effective monitoring and evaluation that serves as check and balance (Ndungu et al 2005). UNESCO (2016) did report that monitoring and evaluation in the education sector has over the year undergone evolutionary stages, stemming from the extensive input-output and project-based monitoring aimed at yielding well-time and consistent evidenced based data which serves as indicator of the progress made at schools and communities and useful in meeting special needs for enhancing the worth, importance and coverage of the sector.

The essence of monitoring and evaluation of teaching and learning in Nigerian education cannot be over emphasised. It is the needed tool that ensures the efficiency, effectiveness and sustainability of the sector. For improved, effective and sustainable teaching-learning interventions, regular monitoring and evaluation practice should be implemented and sustained in all schools (Ngungu, 2015, Appiah 2019). Thus, for authentic monitoring and evaluation of teaching and learning process in Nigeria, teachers and education stakeholders need to be regularly enlightened and trained on the essence of monitoring and evaluation (Appiah, 2019). The essence of every monitoring and evaluation process is to diagnose the various shortfalls in the teaching and learning process to proper corrective measure for improvement (Oseisi 2020).

Concept and Overview of Monitoring and Evaluation

Monitoring and evaluation are two distinct but complementary procedures that work together to strengthen one another. They are used to assess the policy impact or the progress of programme activities concerning set objectives, goals and targets. It is also used to evaluate the activities, outcomes, relevance, impact, effectiveness, efficiency and

long term viability. Inputs (materials, financial and human), process (teaching, teaching, learning and good management techniques) and output (learning outcomes and the quality of result) all contribute to the quality of education. Monitoring is the systematic collection of data over time to assess progress towards achieving goals, outputs and impacts. Mertens (2005) described monitoring as a continuous examination of project implementation to ensure that projects are executed within given time frames, and that beneficiaries received the intended inputs, infrastructure and services. It is the act of collecting data and combining key indicators regularly to count or measure inputs, outputs and processes to report on the function of educational aspects (Mishra, 2005). Noh (2006) characterised monitoring as a form of evaluation that accumulates concrete data for programme reformation. It could also be termed as the time to time careful watch and checking of the activities or programme implementation to determine progress. In education, monitoring involves setting targets and milestones to measure progress and achievement in teaching and learning and to find out whether the impacts are producing the planned outputs or if an educational programme is consistent with planned outputs (Odinko, 2014). Further, Cashin (2012) asserts that monitoring and evaluation is a planned collection and analysis of information concerning the progress of a given project or programmes and it is aimed at improving its outputs, effectiveness and efficiency. Monitoring according to Kettner, Moreney and Martin (2008) is an assessment of the extent to which a programme is implemented as intended and serves the intended target population. According to Richard (1988), as cited in UNESCO (2016), the various types of monitoring include;

- a. Compliance monitoring: This is input-related and a sort of technical monitoring that ensures that educational institutions adhere to predetermined standards and norms established by rules and regulations. It is primarily concerned with educational inputs such as teaching materials, teachers, classrooms and text books to name but few.
- b. Diagnostics Monitoring: This is process-related. It centres on the instructional process that occurs in the classroom situation and to ascertain if learners are learning what is expected of them.
- c. Performance monitoring: This is output-related. It assesses the academic achievement of learners executed through tests and examinations, to know if the learners have learned.

Ojefunde (2019) restated that for effective monitoring to be achieved, these basic considerations should be ensured; what data is to be collected (sources), when data is to be collected (frequency), how data is to be collected (methodology), who collects data (programme implementer), who reports the data (programme manager) and for whom the data is to be collected (policy makers). He also noted that the instrument used for monitoring may include; programme document review, interview, structured questionnaire and rating scales.

Key Features of Monitoring

- On-going and Regular
- Focuses on activities and inputs.
- Track progress against plan.
- Answer the question “are we doing what we planned to do?”

Examples in Education

1. Tracking students’ enrolment and attendance.
2. Monitoring teachers’ deployment and lesson delivery.
3. Following the distribution of textbooks or learning materials.

On the other hand evaluation could be termed as the organised and objective review of current or accomplished programmes, projects or policies, its frame work execution and result aimed at determining the significance and realization of the set objectives, development effectiveness and efficiency, impacts and sustainability. The process of evaluation is usually continuous and entails the assessment of the conflicting scope and depth of teaching learning transactions. It provided insights and understanding of educational policy making and forecasting. Evaluation is a decisive assessment of designed programme to determine the level of accomplishment of set of goals and objectives. It provided feedback for teachers, learners and education policy makers. Founier (2005). Govender and Reddy (2014) viewed evaluation as an applied inquiry approach for obtaining and synthesizing evidence that focuses on the efficacy, efficiency and usefulness of an intervention to the relevant beneficiaries through synergistic interaction and interrelationship of system, environment and stakeholders.

Key Features of Evaluation

- Conducted at specific point.
- Focuses on outcomes and impacts.
- Uses evidences to judge success or failure
- Answer the question “did the policy or programme work?”

Examples in Education

- Assessing whether a new curriculum improving learning outcome.
- Evaluating the impacts of free education policies.
- Reviewing teachers’ training programme.

Importance of Monitoring and Evaluation

1. Improved accountability and transparency.
2. Enhance effectiveness use of resources.
3. Help identify challenges early.
4. Guide policy revision and improvement.

Strategies for Carrying Out Effective Monitoring and Evaluation in Education

Kusek and Rist (2004) highlight the critical strategies for effective monitoring and evaluation, including selecting key indicators to monitor outcomes, establishing baseline data, defining results targets, linking outcomes and targets to planned activities, appraising progress, and reporting findings in line with established standards.

It has been established that monitoring and evaluation has a positive impact on learners, teachers and school overall performance (Ajibade & Ajibade, 2020). The collaboration between United Nation's International Children Education Scientific and Cultural Organization (UNESCO) and the Federal Government of Nigeria laid the foundation for a national monitoring and evaluation framework aimed at tracking learning achievement (Falayafo et al, 1997). Chukwu et al (2019) recommended that schools establish an internal monitoring and evaluation committee to ensure adequate monitoring and evaluation of teaching and learning. Internal monitoring and evaluation according to Harvey and Struzziere, (2008) results in skill maintenance, improvement, expansion, professional, development, reduced stress and increased account stability within educational conclaves.

Challenges to Effective Implementation of Monitoring and Evaluation in Schools

The factors that hamper effective monitoring and evaluation in teaching and learning in Nigerian schools include: lack of experience in evaluation by teachers, school owners and stakeholders; few or absence of qualified evaluators; poor funding of the education sector; little or no technical knowledge on the part of the education stakeholders. In addition, there is the challenge of perceiving monitoring and evaluation as a burden by some teachers. There are teachers and school owners who see monitoring and evaluation as an unnecessary burden. This perception may have been affecting their attitudes and general implementation of the monitoring and evaluation of teaching learning. Similarly, poor and inadequate data collection further undermines trust in available data. There is also the problem of poor management of monitoring and evaluation records. There are instances of misplacement of data obtained from monitoring and evaluation of teaching and learning processes. Lack of education stakeholders' support for monitoring and evaluation of education in Nigeria is also another challenge to monitoring and evaluation.

The Way Forward

To improve educational outcome, monitoring and evaluation policies must move beyond compliance and become practical tools for learning, accountability and improvement. The following strategies outline the way forward:

- Strengthen policy and institutional framework: This requires clearly defined roles and responsibilities at national, district and school level as well as

establishing strong, independent monitoring and evaluation unit within education system.

- Building capacity at all levels: Regular trainings should be provided for teachers, school leaders and education officers. Also, monitoring and evaluation skills should be integrated into teacher education and leadership programmes.
- Ensure adequate and sustainable funding: There should be budgetary allocations dedicated for monitoring and evaluation activities. The government should also invest in data system, supervision and evaluation studies as well as encourage partnership with development agencies and NGOs.
- Improve data quality and management: School records keeping and reporting system should be strengthened. Standardized indicators and tools should be used across schools. Additionally, quality assurance and data verification mechanism should be introduced into the process.
- Leverage technology and innovation: Educational monitoring and evaluators should use digital data collection tools and dashboard. To this end, there is the need to improve ICT infrastructure.
- Promote stakeholders participation: Teachers, parents, learners and communities should be involved in the process. Also, feedbacks and participatory evaluation should be encouraged.
- Use monitoring and evaluation findings for decision makings: There is the need to link monitoring and evaluation results to planning, budgeting and policy revision.
- Provide feedback to schools for continuous improvement. There should be reward for good performance while weakness should be addressed constructively.
- Foster a supportive monitoring and evaluation culture: There should be a shift from punitive to developmental monitoring approaches.
- Continuous review and learning: Regularly assess the effectiveness of monitoring and evaluation process. Strategies should be adapted based on lessons learned and emerging needs.

Conclusion

This chapter has highlighted the critical role of monitoring and evaluation in improving teaching and learning in Nigerian schools. It identified key strategies, challenges, and practical ways of strengthening monitoring and evaluation systems. The chapter concludes that effective monitoring and evaluation are indispensable for achieving a sustainable and high-quality education system in Nigeria, provided existing challenges are adequately addressed.

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CHAPTER FIFTEEN

ENHANCING ACCESS TO EDUCATIONAL RESOURCES AND CURRICULUM IMPLEMENTATION THROUGH THE INTEGRATION OF MOBILE AND CLOUD TECHNOLOGIES IN SCHOOL LIBRARIES

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Introduction

Curriculum implementation in Nigerian schools continues to face a range of significant challenges that impact the quality and effectiveness of education across the country. Factors such as inadequate teacher training, overcrowded classrooms, poor infrastructure, and limited funding persistently hinder the delivery of curricula as intended (Ukpong & Udoh, 2014). These systemic obstacles are further exacerbated by security concerns, inconsistent policy application, and regional disparities, which collectively limit equitable access to quality education and impede the development of critical skills necessary for Nigeria's contemporary socio-economic needs (Akin-Ibidiran et al., 2022). The consequences of these challenges are felt through reduced student engagement, sub optimal learning outcomes, and a curriculum that often remains misaligned with global educational trends and technological advancements (Ukpong & Udoh, 2014).

Within this complex educational landscape, school libraries hold a pivotal yet often underappreciated role as essential hubs for learning and resource access. Thus, well-managed and resourced libraries provide students and educators with vital opportunities to engage with diverse information materials beyond traditional textbooks, which foster independent research, critical thinking, and lifelong learning habits (Busayo, 2011; Tella & Akande, 2007). In Nigeria and broader African contexts, school libraries serve as crucial equalizers that support literacy development and information-seeking competencies that are key to bridging gaps in formal instruction and curriculum delivery (Nnadozie & Egwin, 2008). These repositories of knowledge, however, often suffer from infrastructural deficits, outdated collections, and limited incorporation of modern technologies, thereby restricting their full potential to enhance educational outcomes.

The rapid rise and spread of mobile and cloud technologies create significant opportunities to reshape how school libraries provide educational resources. Mobile

devices, prized for their portability and constant connectivity, together with cloud computing's flexible storage, effortless information sharing, and cost-efficient software options, form new channels for delivering instructional materials and supporting curriculum objectives regardless of physical or geographic boundaries (Gambo & Nachandiya, 2016; Sultan, 2010). The integration of these technologies in school libraries enables flexible access to learning materials, promotes collaborative learner engagement, and reduces reliance on traditional infrastructure features, which are especially critical in addressing Nigeria's infrastructural and resource challenges (Agbarakwe, 2025; Adenubi, 2025). Tools such as Google Drive, OneDrive, and online video platforms are increasingly being utilized for metadata organisation, content dissemination, and virtual academic collaboration within Nigerian educational contexts, thus, underscoring a shift towards digital approaches that align with global educational technology trends.

Mobile learning is a sophisticated type of e-learning that relies primarily on wireless technology and smart devices as the tools for teaching and learning. These gadgets combine the capabilities of a computer, DVD player, MP 3 player and gaming console into a single device. They serve as powerful educational tools with strong potential to enhance classroom activities and outdoor learning, improving overall productivity. Jegbefume, Ikhimeakhu and Muhammad (2025) reported that the extensive use of mobile devices among youth for communication, connectivity, and collaboration raises an insight into identifying their thoughts for its use to enhance learning. Consequently, it has become highly significant in the lives of students and young people worldwide. Furthermore, a study by Agbarakwe and Amadi (2019) investigating students' perceptions of using mobile devices for learning found that students generally held positive views about mobile learning, largely disagreed that owning a mobile device would negatively affect their studies, and that most students own standard smartphones and laptops and prefer using mobile devices both at home and elsewhere. Fundamental features that promote mobile learning include accessibility — allowing learners to access content from virtually anywhere; personalization — enabling tailored learning paths based on individual needs; and interactivity.

This paper presents a narrative review aimed at synthesizing contemporary research on the integration of mobile and cloud technologies in Nigerian school libraries, with a focus on enhancing access to educational resources and supporting effective curriculum implementation. With the analysis of current trends and gaps within relevant literature, the paper aspires to highlight best practices and policy recommendations to optimize educational resource accessibility and foster curriculum enrichment through technological innovation. The central guiding questions in this narrative review include:

What are the principal barriers impeding effective curriculum implementation in Nigerian schools, and how can school libraries mitigate these challenges? How have

mobile and cloud technologies been harnessed in school libraries across Nigeria to support and enhance curriculum goals?; what is the effect of integrating these technologies on resource accessibility, teaching methodologies, and student learning experiences and which strategies and policy frameworks can promote the sustainable and effective integration of mobile-cloud technologies within Nigerian school library systems?

The overarching objective is to offer a comprehensive and critical synthesis that illuminates the transformative potential of mobile and cloud technologies for Nigerian school libraries. The review aims to contribute to academic discourse and inform practitioners, policymakers, and educators, fostering informed decisions that will support innovation in curriculum delivery and resource management. Such a synthesis is timely and critical as Nigeria strives to achieve educational equity, quality, and relevance in an increasingly digital world.

Conceptual and Theoretical Underpinnings

A robust conceptual framework is essential for understanding the integration of mobile and cloud technologies in Nigerian school libraries and their potential to enhance curriculum implementation. This framework outlines core definitions, relevant theories that explain technology adoption in education, and the importance of creating learner-centred, resource-rich environments that align with curriculum goals. Mobile technologies, which central to this discussion, refer to portable digital devices such as smartphones, tablets, laptops, and other wireless gadgets including Internet of Things that facilitate access to information and enable learning from virtually any location (Heick, 2022). These technologies support continuous connectivity and flexible learning opportunities that transcend traditional classroom boundaries. Mobile devices allow students and educators to engage with educational content outside fixed physical settings, which is particularly valuable in Nigeria, where infrastructural limitations often impede access to conventional learning resources (Gambo & Nachandiya, 2016).

Cloud computing can be defined as a technology that relies on the transfer of processing and storage space of a computer to the so-called cloud that is accessed via the Internet (Dumbiru, Babatope and Owairu 2024). According to Dime and Okeji (2023) it is a combination of computer and internet usage that can build a consolidated data with many libraries. Cloud computing complements mobile technologies by providing scalable, internet-based services like data storage, software access, and online collaboration platforms (Sultan, 2010). Through cloud computing, users can store vast educational resources on remote servers accessible at any time. Platforms such as Google Drive and Microsoft OneDrive are widely employed in Nigerian educational settings for storing learning materials, facilitating group projects, and managing curriculum resources with minimal reliance on local infrastructure (Anike & Otubelu, 2024; Adenubi, 2025). The

cloud's ability to reduce infrastructure costs and prevent data loss through backups makes it an attractive solution in environments where funding and technical support are often scarce (Suleiman, H., Vashista, R.Garba, A. and Jimah, H. 2017). Therefore, mobile and cloud technologies create an ecosystem that significantly extends the reach and effectiveness of educational resource provision in school libraries.

Curriculum implementation refers to the process through which an educational curriculum is put into practice within schools, encompassing the delivery of planned content, teaching methodologies, and assessment aligned to national educational standards (Ukpong & Udoh, 2014). In Nigeria, challenges such as insufficient teacher preparation, poor access to instructional materials, and infrastructural deficits frequently hamper the implementation of curricula (Nnadozie & Egwin, 2008). School libraries play an instrumental role in addressing these challenges by serving as information hubs that provide supplementary materials, foster research skills, and support the development of critical thinking and lifelong learning competencies among students and other users (Busayo, 2011). Their effectiveness is, however, often limited by outdated collections and a lack of ICT integration, which mobile-cloud technologies can help remedy.

Understanding how these technologies are adopted in educational settings requires theoretical insight. The “Technology Acceptance Model (TAM)”, developed by Davis (1989), provides one of such insights. The TAM suggests that users’ acceptance of a technology depends primarily on their perception of its usefulness and ease of use. Studies from Nigeria such as Abass, Alaba and Samuel, (2021) and Anike and Otubelu (2024) have confirmed that educators’ and librarians’ beliefs about the practicality and simplicity of mobile-cloud tools influence their willingness to integrate the technologies into teaching and library services. For example, if librarians perceive cloud computing as enhancing resource management without complex technical hurdles, their adoption rates increase. On the other hand, fears about cost, security, or usability can diminish technologies acceptance. This conceptual framework recognises that technology adoption is a socio-technical process embedded in educational culture, infrastructure, and policy contexts. The effective integration of mobile and cloud technologies in Nigerian school libraries depends on aligning these innovations with curriculum goals, institutional readiness, learner needs, and ongoing capacity development. This holistic perspective facilitates understanding of both the potentials and constraints of digital transformation in resource-limited educational environments.

Overview of Mobile and Cloud Technologies in Education

Mobile and cloud technologies have become essential drivers of educational transformation worldwide. These technologies offer unprecedented opportunities to

expand educational access, improve resource management, and support innovative curriculum delivery in schools and school libraries. The most important features of mobile and cloud technologies are portability, connectivity, and ubiquity. Portability allows learners and educators to carry educational content and tools wherever they go, facilitating study sessions outside traditional classrooms or libraries (Klopfer & Squire, 2008). Connectivity ensures that mobile devices can link to the internet or local networks, enabling real-time access to digital resources, communication with teachers or peers, and participation in collaborative learning activities (Pea & Maldonado, 2006). Ubiquity means that learning is no longer confined to a particular place or schedule, but has provisions that allow students to engage with content anytime and anywhere that they have access to their devices and the internet (Gambo & Nachandiya, 2016). In Nigeria, where schools often face infrastructural challenges such as limited physical libraries or poor computer lab availability, mobile technologies provide vital alternative pathways to educational resources and learning environments (Anike & Otubelu, 2024).

Moreover, cloud computing serves as a complementary backbone to mobile technologies by offering scalable, cost-efficient, and remote access to storage, software, and educational services over the internet (Sultan, 2010; Almaiah & Al-Khasawneh, 2020). Cloud platforms allow educational institutions to store vast amounts of curricular content, applications, and data on remote servers managed by third-party service providers, thereby reducing reliance on costly on-site hardware and maintenance (Suleiman et al., 2023). Scalability enables institutions to increase or decrease resources based on demand, which is particularly useful during peak enrollment or examination periods (Almaiah & Al-Khasawneh, 2020). Furthermore, cloud computing follows the Software-as-a-Service (SaaS) model, whereby users run applications such as word processing, spreadsheets, or library management systems through web browsers without needing local installation or upgrades (Singh, 2022). Remote access means students, teachers, and librarians can reach educational materials and tools from any internet-enabled device, fostering inclusivity and flexibility (Wang, Chen & Khan, 2014).

Empirical findings have indicated that the educational benefits of mobile-cloud solutions extend beyond access and convenience. These technologies support innovative pedagogical approaches, such as flipped classrooms, gamification, and real-time data analytics that personalise instruction and enhance learner motivation and achievement (Sultan, 2010; Alakuu et al., 2025). Cloud platforms enable educators to adapt content dynamically, monitor learning outcomes, and intervene promptly when students encounter difficulties. Such capabilities have been shown to improve retention, engagement, and curriculum alignment in various African and global educational settings (Sharples, 2000; Asadi et al., 2020). However, major challenges that constrain mobile and cloud computing technologies, include inconsistent internet connectivity in rural areas, limited digital literacy among educators and students, and policy or funding

gaps that restrict large-scale implementation (Gambo & Nachandiya, 2016; Agbarakwe, 2025). Addressing these obstacles requires coordinated efforts across government, private sector, and educational institutions to invest in infrastructure, training, and supportive regulatory frameworks.

Status of Mobile and Cloud Technology Adoption in Nigerian School Libraries

Mobile and cloud technologies are increasingly influencing education and library services in Nigeria, though their adoption in school and academic libraries faces mixed realities. There is growing awareness of their benefits, and some progress has been made, yet infrastructural, financial, and human resource challenges continue to hold back full integration. Empirical findings, anecdotal evidences and observations have revealed that while Nigerian libraries recognise the transformative potential of emerging technologies, practical adoption remains limited and uneven. Slow uptake of mobile and cloud technologies has been attributed to underfunding, poor infrastructure, and human capacity gaps even as awareness and perceived usefulness remain high (Saibakumo, 2021; Bassey & Owushi, 2023). Also, findings have shown that in school libraries, where digital tools like social media and e-lending have gained some traction, comprehensive digital integration is constrained by unreliable internet access, erratic power supply, and insufficient budgets (Oduwole & Oyedokun, 2023; Suleiman et al., 2023). The absence of clear ICT policies and strategic plans tailored to library services further hampers coordinated progress, leading to fragmented or unsustainable initiatives (Dei, 2020; Haq, 2021).

In practice, Nigerian school libraries are increasingly adopting well known cloud platforms like Google drive and Microsoft OneDrive, along with learning management systems such as Moodle and Google Classroom (Anike & Otubelu, 2024). These tools allow for storing and sharing resources, supporting virtual collaboration, organizing library catalogs, and integrating with classroom instruction. Additionally, the adoption of basic AI features such as; chatbots and automated cataloguing is becoming a way to increase user engagement and improvement service efficiency in schools with limited staff or expertise (Akhimien & Osawele, 2024). These technologies enable mobile-device accessibility of educational resources, making learning more flexible and helping to bridge gaps caused by physical infrastructure shortfalls.

Numerous challenges obstruct widespread adoption while infrastructure deficits such as poor internet bandwidth, intermittent electricity, and lack of modern hardware remain foremost barriers (Tella et al., 2017; Saibakumo, 2021). Funding for ICT remains low, with 91% of surveyed school library professionals citing inadequate budgets as a major constraint and 88% pointing to unreliable power and internet services, in a study in Oyo State, Nigeria. (Oduwole & Oyedokun, 2023). Human capital is another critical hurdle as affirmed by about 79% of respondents who reported insufficient ICT skills among

school librarians and teachers as factors that limit their confidence and ability to leverage emerging technologies effectively in schools (Bassey & Owushi, 2023). Resistance to change is another factor, driven by inadequate training, limited awareness of the benefits, and prevailing attitudes (Akwang, 2021). Moreover, the lack of supportive policies or frameworks for ICT adoption in libraries leaves institutions without clear strategies or funding pathways (Dei, 2020).

Impact of Mobile and Cloud-Computing Technologies on Curriculum Delivery and Educational Outcomes

Agbarakwe, (2025) opined that mobile and cloud technologies are transforming curriculum delivery and educational outcomes in Nigeria and across the world. As these technologies become more accessible, they play a vital role in supporting curriculum goals such as critical thinking, collaboration, and independent learning. They also enhance flexibility and resource availability, particularly for under-resourced schools. Furthermore, they underpin innovative pedagogical approaches like blended learning and flipped classrooms, which have gained traction globally and within Africa. The combination of mobile devices and cloud computing provide learners and educators with powerful tools to engage with educational content anytime and anywhere. This flexibility supports curriculum goals, especially the development of critical thinking skills. According to Agbarakwe (2025), mobile-cloud technologies enable learners to access diverse information resources in real-time, thus enabling them to engage with content that encourages problem-solving and analytical thinking. This move away from rote learning helps students develop deeper understanding and reasoning skills, essential for 21st-century education.

The ability to collaborate is another core curriculum goal strengthened through mobile-cloud integration. Cloud platforms such as Google Drive and Microsoft OneDrive allow learners and teachers to co-create and share documents seamlessly across devices and locations (Gambo & Nachandiya, 2016). This facilitates group work and peer learning, which are key to cooperative learning theories and curriculum standards emphasising social constructivism (Vygotsky, 1978). Nigerian students, in particular, can benefit from this, as cloud-enabled collaboration helps overcome physical and infrastructural barriers in segregated or remote schools (Anike & Otubelu, 2024). Despite these positive impacts, challenges remain. Internet connectivity and reliable power supply are still problematic in many Nigerian regions, affecting seamless use of mobile-cloud technologies (Gambo & Nachandiya, 2016). Additionally, digital literacy gaps among teachers and learners can limit full utilisation of available tools (Anike & Otubelu, 2024). Addressing these issues requires ongoing investment, capacity building, and policy support to ensure that mobile-cloud technology adoption translates into sustained improvements in curriculum delivery and educational outcomes. Mobile and cloud technologies significantly support curriculum goals of critical thinking, collaboration,

and independent learning through enhanced access, flexibility, and pedagogical innovation. They play a key role in reducing educational disparities in under-resourced Nigerian schools and facilitate approaches such as blended and flipped learning that engage learners more deeply. To maximise these benefits, stakeholders must prioritise infrastructure development, digital skills training, and supportive policies. This will enable Nigerian education to leverage mobile-cloud technologies effectively for transformative curriculum delivery and improved learner outcome.

Barriers to Effective Integration

Mobile and cloud technologies hold great promise for transforming education in Nigeria, but their effective integration into school libraries and curriculum delivery faces considerable barriers. These obstacles cut across technological, institutional, human, and socio-economic dimensions, shaping the pace and scope of adoption. Drawing on research from Nigeria, Africa, and global contexts, this essay critically examines the key barriers impeding the adoption of mobile-cloud technologies in Nigerian school libraries.

Technological challenges remain the most visible and immediate barriers. Nigeria's internet infrastructure is inconsistent and often unreliable, especially in rural and underserved areas. According to United Nations Economic and Cultural Organization UNESCO (2023), only about 20% of schools in rural Nigeria have access to digital learning materials, a statistic reflecting the broader digital divide. Persistent internet instability means learners and libraries struggle to access cloud-hosted resources smoothly. Hardware limitations also constrain progress, since school libraries frequently lack up-to-date devices or sufficient quantities to meet demand, and frequent power outages further reduce usability (Tella et al., 2017; Saibakumo, 2021). These technical deficits reduce learners' and educators' ability to benefit fully from mobile-cloud systems, undermining confidence and motivation for adoption.

Institutional and policy challenges impose another significant layer of difficulty. Nigerian schools and libraries often operate without clear guidelines or coherent policies tailored for ICT and cloud integration in education (Dei, 2020). Strategic plans that include infrastructure development, maintenance, and digital resource management are frequently absent or underfunded. Funding constraints are acute, given limited government expenditure on education and technology. This results in fragmented, unsustainable initiatives rather than coordinated, scalable adoption efforts (Haq, 2021). The lack of policy clarity also affects procurement procedures, staff incentives, and partnerships with technology providers, leaving many libraries in a reactive rather than proactive stance.

Human factors are equally critical barriers. Digital literacy among librarians, teachers, and students is uneven and often insufficient for confident use of mobile and cloud tools (Bassey & Owushi, 2023). Without relevant training and continuous professional development, staff struggle with technical operations, digital content management, and pedagogical integration (Dowdy, 2020). Resistance to change, fueled by fears of technology replacing jobs or complicating tasks, further slows adoption (Akwang, 2021; Ibrahim, 2024). Attitudinal barriers are supported by institutional cultures steeped in traditional practices, which limit innovation and experimentation with technology in daily teaching and library management.

Strategies for Successful Integration

Mobile and cloud technologies offer immense potential to revolutionise curriculum delivery in Nigerian school libraries. However, to fully capitalise on these benefits, deliberate and strategic approaches are necessary to ensure their successful integration. First, capacity building and professional development are fundamental. Librarians and educators must possess the knowledge and skills to effectively use mobile and cloud technologies. Evidence suggests that without targeted training, many education personnel remain hesitant or underprepared to integrate these tools (Dowdy, 2020; Shahzad et al., 2021). For instance, Anike and Otubelu (2024) observed that Nigerian libraries improved cloud adoption significantly after intensive staff training and participatory workshops. Capacity building must go beyond technical skills to include pedagogical integration, information literacy, and change management to cultivate confident, innovative users. Ongoing professional support and peer learning networks also reinforce learning and adaptation over time. In African contexts, where resource constraints persist, blended training models combining online and face-to-face components prove especially effective (Gambo & Nachandiya, 2016).

Second, investment in ICT infrastructure designed specifically for mobile-cloud environments is vital. Nigerian libraries struggle with poor internet connectivity, frequent power outages, and inadequate hardware provision (Saibakumo, 2021; Tella et al., 2017). Tailored infrastructure investments should prioritise affordable broadband solutions, solar-powered or backup energy systems, and procurement of versatile mobile devices compatible with cloud services. Cloud computing reduces some hardware burdens but requires reliable internet access and functional devices to maximise benefits (Suleiman et al., 2023). Investing in interoperable systems ensures seamless integration of data and resource sharing across platforms and libraries. Long-term equipment maintenance and replacement plans must accompany initial infrastructure purchases to sustain functionality (Almaiah & Al-Khasawneh, 2020).

Third, supportive policies and implementation frameworks are essential to guide and institutionalise technology use. Nigerian education and library sectors have faced

challenges from ambiguous or non-existent policies regarding ICT adoption (Dei, 2020). Clear national and institutional policies that articulate goals, standards, funding mechanisms, and accountability measures help synchronise efforts and avoid fragmented adoption. For example, cloud computing policies that include data security, privacy protection, and user training standards protect stakeholders and build trust (Onwubiko et al., 2020). Policy frameworks should also address digital inclusion, ensuring equitable access across socio-economic and geographic divides. Effective frameworks enable libraries to align mobile-cloud integration with broader educational strategies and curriculum goals (Asadi et al., 2020).

Gaps in the review

Mobile and cloud technologies have become vital components of modern education, offering innovative pathways to enhance curriculum delivery and learning outcomes. However, despite growing adoption in Nigeria and other African countries, many research gaps exist, calling for further empirical studies. One major gap in the current literature lies in the detailed understanding of user experience with mobile-cloud educational technologies. Studies often focus on technological features or adoption rates but pay less attention to learners' and educators' lived experiences, motivations, and challenges while using these tools (Gambo & Nachandiya, 2016). Further qualitative and mixed-method research could illuminate how Nigerian students and teachers interact with mobile-cloud platforms in their specific socio-cultural and infrastructural contexts. Examining factors such as usability, engagement, emotional responses, and accessibility on diverse devices can inform user-centred design and tailored interventions (Asadi et al., 2020; Wang, Chen & Khan, 2014). This would complement existing quantitative data on adoption to ensure that technologies meet actual user needs effectively.

In addition, more rigorous studies evaluating pedagogical effectiveness of mobile and cloud-based interventions in Nigerian schools are needed. While narrative reviews highlight potential for critical thinking, collaboration, and learner autonomy, empirical research measuring how these outcomes manifest in practical classroom settings remains sparse (Agbarakwe, 2025; Anike & Otubelu, 2024). Longitudinal studies and controlled experiments could assess impacts on student achievement, motivation, and digital literacy. Research should also explore how educators integrate mobile-cloud tools with curriculum content and pedagogical methods, identifying best practices and barriers to effective use (Sultan, 2010; Shakor & Surameery, 2021). Such evidence would strengthen policy and investment decisions to optimise technology-enhanced learning in Nigerian education systems.

Scalability and sustainability represent pressing questions for mobile-cloud technology use, especially in resource-constrained environments. Most current implementations remain pilot projects or limited in scope, with little research on scaling solutions to reach underserved rural schools and large student populations (Gambo & Nachandiya, 2016). Future work should investigate strategies for maintaining infrastructure, training educators, and supporting ongoing technical needs across diverse regions of Nigeria. Comparative studies with other African countries and global examples of successful scaling can provide valuable lessons (Almaiah & Al-Khasawneh, 2020). Understanding economic models, funding mechanisms, and institutional capacity required for widespread adoption will be critical to expanding equitable access to technology-facilitated education.

While studies from Nigeria and other African countries reflect these themes, integrating global insights will enrich research quality and relevance. For example, Scandinavian and East Asian countries offer advanced models for cloud-based mobile learning with strong institutional support, pedagogical innovation, and technology infrastructure (Lim et al., 2015; Sultan, 2010). Comparative studies could adapt such models to Nigerian realities and identify contextual enablers and constraints.

Conclusion

Mobile and cloud technologies are poised to transform Nigerian school libraries in profound ways. The review first highlights the growing awareness and use of cloud computing tools such as Google Drive, OneDrive, Gmail, YouTube, and Google Scholar among librarians in Nigerian colleges and schools (Saibakumo, 2024). These platforms facilitate an expanded scope of library services, enabling storage, sharing, and collaboration on digital resources with greater efficiency and accessibility. Librarians report benefits including remote access to files, increased storage capacity, improved data security, routine software updates, and lower maintenance costs. These features help mitigate traditional challenges of manual or paper-based library systems, notably in settings constrained by limited budgets and infrastructure.

Stakeholders must prioritize investment in reliable ICT infrastructure, including broadband internet and energy solutions suited to challenging environments. Capacity building efforts should focus on enhancing the digital and pedagogical competencies of librarians and teachers to foster confident and meaningful use of mobile-cloud technologies. Policymakers should develop clear, inclusive, and practical frameworks to guide sustainable adoption and integration within Nigeria's educational systems. Collaboration and shared learning across sectors and regions can accelerate innovation and resource sharing.

In conclusion, mobile and cloud technologies offer a promising avenue for addressing Nigeria's educational challenges through enriched and flexible curriculum delivery supported by school libraries. While adoption is progressing, concerted multi-sectoral efforts addressing technological, human, policy, and funding barriers are vital. With deliberate strategy and cooperation, Nigeria can unlock the full potential of these technologies to enhance educational equity, quality, and relevance in a rapidly digitalising world.

Recommendations

The following recommendations were proffered based on the findings of the review:

1. Training and retraining of school library personnel on digital literacy
2. Incorporation of emerging technologies such as mobile and cloud technologies in curriculum delivery
3. Policy makers to support the introduction and implementation of modern technologies
4. Installation and maintenance of reliable Internet facility for effective curriculum delivery
5. Ensuring of adequate power supply and provision of alternative sources such as solar, and generator.
6. Establishment of an ICT policy to guard the introduction and implementation of ICT for curriculum delivery

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CHAPTER SIXTEEN

SECONDARY SCHOOL TEACHERS' ATTITUDES TOWARDS ARTIFICIAL INTELLIGENCE AND DIGITAL LEARNING TOOLS IN THE FEDERAL CAPITAL TERRITORY, ABUJA

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Introduction

The 21st century has ushered in an era of unprecedented technological advancement, with Artificial Intelligence (AI) and Digital Learning Tools (DLTs) rapidly transforming various sectors, including education. The integration of these technologies into educational practices holds immense promise for revolutionizing teaching and learning processes, offering personalized learning experiences, enhancing engagement, streamlining administrative tasks, and bridging educational gaps. Globally, educational systems are increasingly exploring and adopting AI-powered platforms, adaptive learning systems, virtual tutors, and other digital tools to improve pedagogical outcomes and prepare students for a digitally-driven future (Kearns, 2018; Means et al., 2010).

In Nigeria, a nation striving for educational development amidst persistent challenges such as large class sizes, resource constraints, and varying levels of digital literacy, the potential of AI and digital learning tools is particularly significant. The use of AI and digital learning tools in education also has been shown to have several benefits, including enhanced students' engagements, improved academic achievement, and increased access to educational resources. (Eke, 2024). AI-powered adaptive learning systems, for example, can provide personalized learning experiences for students, tailoring the content and pace of instruction to their individual needs. However, the success of AI and digital learning tools in education depends on the attitudes and responses of teachers and students towards their use.

The Federal Capital Territory (FCT), Abuja, as the nation's capital, represents a microcosm of this evolving educational landscape, showcasing both the aspirations for technological integration and the inherent challenges. While there is a growing recognition of the transformative power of these tools, their successful implementation heavily relies on the attitudes and readiness of the primary stakeholders: teachers and

students (Ertmer et al. 2012). Teachers, as facilitators of learning, play a pivotal role in the effective integration of any new technology into the classroom. Their willingness to adopt, adapt, and utilize AI and DLTs, coupled with their perceived competence and the availability of adequate training and infrastructure, directly influences the success of such initiatives. Similarly, students' attitudes, their digital literacy levels, and their perception of the usefulness and ease of use of these tools are crucial determinants of their engagement and learning outcomes.

Globally, the integration of AI in education is often seen as a catalyst for personalized learning, adaptive assessment, and intelligent tutoring systems. Many studies indicate a general optimism among educators regarding AI's potential to alleviate administrative burdens, provide individualized feedback, and enhance student engagement. For instance, Polak, Schiavo, and Zancanaro (2022) found that teachers generally hold a positive attitude towards AI in education and are highly motivated to integrate AI content in schools. They recognize AI's potential to foster creativity and problem-solving in classrooms. Similarly, studies by Alenezi et al. (2023) indicate that integrating digital education in education can enhance competitiveness, improving teaching skills and provide high-quality education though it faces challenges related to technological resources. The Technology Acceptance Model (TAM), which considers perceptions of usefulness and ease of use, has been frequently applied in this context, supporting the notion that positive perceptions lead to greater adoption (Adewole-Odeshi, 2014; Costales et al., 2022; Iqbal & Bhatti, 2015).

Previous studies in Nigeria and elsewhere have highlighted both the opportunities and obstacles associated with AI and digital learning adoption in education. For example, a study by Ertmer et al. (2012) found that teachers' attitudes towards technology integration were influenced by their beliefs about the role of technology in education and their level of comfort with technology. Similarly, a study by Kim et al. (2017) found that students' attitudes towards technology integration were influenced by their perceived usefulness and ease of use. However, alongside this enthusiasm, concerns about AI's ethical implications, data privacy, and the potential displacement of human teachers have also been raised. Hasan (2024) and Williamson and Eynon (2020) underscore these challenges, emphasizing the need for robust ethical data governance and comprehensive teacher training to bridge digital literacy gaps. Digital learning tools, encompassing a wide array of technologies from Learning Management Systems (LMS) to multimedia resources and collaborative platforms, have also been a subject of extensive research. The COVID-19 pandemic significantly accelerated the adoption of these tools worldwide, prompting a rapid shift to online and blended learning models. Grab et al. (2019) presented digital transformation as a disruptive force that alters the methods of teaching and learning.

In the Nigerian context, the narrative surrounding AI and digital learning tools mirrors global trends but with amplified challenges due to existing infrastructural deficits. Research indicates that while the potential of AI to enhance learning and streamline administration is recognized, its full integration is hampered by factors such as inadequate internet penetration, erratic power supply, lack of skilled professionals, and low digital literacy, particularly in rural areas (Thomas & Gambari, 2021; Mubangizi, 2024). Regarding teachers' attitudes in Nigeria, studies suggest a mixed but generally positive outlook, often tempered by practical limitations. Eke Ogbu Eke (2024) investigated the readiness and attitudes of Nigerian teacher educators towards AI adoption. The study found a high level of readiness and positive attitudes among these educators towards AI-powered tools like personalized learning platforms and automated grading systems. They recognized AI's potential benefits in addressing educational challenges and expressed confidence in integrating AI-driven systems.

However, he also identified significant barriers, including inadequate infrastructure, insufficient training, and ethical concerns, which need to be addressed for successful AI integration. This highlights the crucial need for comprehensive training and professional development programs for Nigerian educators. Similarly, Ogunode and Ehichoya (2024) and Ogunode and Ejike (2023) have underscored the importance of government funding, infrastructure provision, and consistent training programs for teachers and administrators on digital skills to facilitate the effective deployment of AI in Nigerian schools. For students in Nigeria, access to digital tools and a positive attitude towards e-learning are evident, especially with the increased reliance on online resources like Google, WhatsApp, and YouTube (Research Gate, "Attitude of Students Towards E-learning in South-West Nigerian Universities"). However, the digital divide, particularly between urban and rural areas, remains a significant concern, potentially exacerbating educational inequality if AI and digital solutions are concentrated in well-funded urban schools (Tang & Su, 2024). Studies in the FCT itself, such as the one by Egbunu Roseline (2024) on the utilization of digital tools in teaching Biology in Abuja Municipal Area Council (AMAC), revealed that while Google search engine and Wikipedia are commonly used, many teachers are unaware of other beneficial digital tools like Padlet, Socrative, and Notability. High cost of internet subscription and slow internet speed were also identified as major constraints.

Challenges often include inadequate infrastructure, insufficient training, ethical concerns regarding data privacy, and a general resistance to change. However, the potential benefits, such as personalized learning pathways, enhanced teacher support, and data-driven policymaking, are compelling arguments for their integration. This research aims to comprehensively assess the current attitudes of secondary school teachers towards the use of AI and digital learning tools within selected schools in the Federal Capital Territory, Abuja. By exploring their perceptions, readiness, and the

factors influencing their adoption or resistance, this study seeks to provide valuable insights for policymakers, educators, and technology developers to foster a more effective and equitable integration of these transformative technologies into the Nigerian educational system. Understanding these attitudes is paramount for developing targeted interventions, training programs, and policy frameworks that can facilitate a smooth and successful transition to a more digitally-enabled learning environment in the FCT and by extension, across Nigeria.

Objectives of the Study

The main objective of this study is to assess the attitudes of teachers towards the use of AI and digital learning tools in the Federal Capital Territory (FCT), Abuja.

The specific objectives of the study are:

1. To determine the level of awareness of AI and digital learning tools among teachers in FCT, Abuja.
2. To ascertain the perceived ease of use of AI and digital learning tools by teachers in FCT, Abuja.
3. To identify the factors influencing teachers' attitudes towards the use of AI and digital learning tools in FCT, Abuja.

Research Questions

The following research questions will guide this study:

1. To what extent is the level of awareness of AI and digital learning tools among teachers in FCT, Abuja?
2. How easy is the use of AI and digital learning tools by teachers in FCT, Abuja?
3. What factors influence teachers' attitudes towards the use of AI and digital learning tools in FCT, Abuja?

Table 1: Demographic Distribution of Participating Teachers

Category	Sub-Category	Number of Schools	Number of Teachers	Percentage (%)
Location	Urban Areas	6	60	50.0%
	Rural Areas	6	60	50.0%
School Type	Private Schools	6	60	50.0%
	Public Schools	6	60	50.0%
LGA	Kwali	4	40	33.3%
	Gwagwalada	4	40	33.3%
	AMAC	4	40	33.3%

Method

The survey research design was used for this study because it is capable of eliciting respondents' opinions on the current attitudes of secondary school teachers towards the use of AI and Digital Learning tools. The population comprised of teachers in FCT Secondary Schools. FCT was stratified along the existing six Local Government Area Councils (LGACs) of which three - Kwali, Gwagwalada and AMAC were randomly selected. From each of the three LGACs selected, four Senior Secondary Schools made up of two urban (one public and one private) and two rural (one public and one private) were selected.

A multi stage sampling procedure involving stratified, simple random and purposive sampling techniques were used in the study. In each of the selected senior secondary schools, ten teachers used for the study were selected using stratified and simple random sampling techniques. Stratification of the teachers was done along the following: the core subjects, the fields of study and the trade subjects. From each school, a teacher from each of the 4 core compulsory and cross- cutting subjects(4 teachers); a teacher from each of the four Fields of Study(4 teachers); and two from the Entrepreneurship/Trade Subjects(2 teachers) were selected. A total of 120 Secondary School teachers selected for the study from FCT.

Quantitative data were sourced through the administration of questionnaires. The Teachers' Questionnaire, tagged "Attitude towards AI and Digital Learning Tools (ATADLT)", was made up of three sections; Section A consisted of fourteen items eliciting background information, which includes gender, school type, school location and school ownership. Sections B and C elicited information on the attitude of teachers towards AI and Digital Learning Tools, including some of the associated challenges. The Cronbach's alpha was used to establish a reliability coefficient of 0.75 for the teachers' questionnaire. The 120 teachers' questionnaire was administered on the selected teachers and on-the-spot observations were carried out. Data collected were analyzed using descriptive statistics such as frequency and percentages to provide answers to the research questions raised for the study. Qualitative data were transcribed and collated for addressing each research question.

Research Question 1: To what extent is the level of awareness of AI and digital learning tools among teachers in FCT, Abuja?

This question sought the opinions of the teachers on the level of awareness of AI and digital learning tools among teachers in FCT. The summary of teachers' responses is presented on Table 2.

Table 2: Frequency and Percentages of Teachers' Responses on the level of awareness of AI and digital learning tools among teachers in FCT

Awareness Level	Frequency	Percentage
High	69	57.5
Moderate	47	39.2
Low	04	03.3
Total	120	100

The results presented in Table 2 shows that 57.5% of the secondary school teachers maintained that the level of awareness of AI and digital learning tools among teachers in FCT is high. The table also revealed that 39.2% of the teachers found the level of awareness to be moderate while only 3.3% of the teachers reported low extent level of awareness of AI and digital learning tools among teachers in FCT. This result implies that a majority of the secondary school teachers in FCT indicated high level of level of awareness of AI and digital learning tools among teachers in FCT.

The analyses of teachers' responses on level of awareness of AI and digital learning tools among teachers in FCT are presented in table 3.

Table 3: Overall Teachers' Attitudes Towards awareness of AI and Digital Learning Tools

Statements - Are you aware that:-	Agree (Freq/%)	Disagree (Freq/%)
1. There are various AI tools	85 (70.8%)	35(29.2)
2. Digital Learning Platforms(DLPs) exist	113 (94.2%)	7 (5.8%)
3. AI helps understand topics	95 (79.2%)	25 (20.8%)
4. Digital tools make learning interesting	117 (97.5%)	3 (2.5%)
5. Using digital tools improves grades	102 (85%)	18 (15%)
6. AI tools are easy to use	18 (15%)	102 (85%)
7. DLPs are easy to navigate	8 (6.7%)	112 (93.3%)

Table 3 shows the analyses of teachers' responses on level of awareness of AI and digital learning tools among teachers in FCT. From the table, it could be deduced that more than 70% of the teachers rated the Teachers' Attitudes Towards awareness of AI and Digital Learning Tools as high. On the other hand, majority of the teachers' ratings on the use of AI tools and navigation on digital learning platforms (DLPs) are very low. The indication of the results presented in table 3 is that, the Teachers' Attitudes Towards awareness of AI and Digital Learning Tools is generally high.

Research Question 2: How easy is the use of AI and digital learning tools by teachers in FCT, Abuja? The analyses of teachers' responses on the perceived ease of use of AI and digital learning tools by teachers are presented in table 4.

Table 4: Means and Standard Deviation on the teachers' responses on the perceived ease of use of AI and digital learning tools by teachers

S/N	Statements	Mean	Standard Deviation SD	Rmks/Decision
1.	AI can personalize learning	3.75	1.95	Accepted
2.	Digital tools enhance engagement	1.10	0.50	Rejected
3.	AI & digital leaning tools reduce workload	2.60	1.10	Accepted
4.	AI tools easy to use	2.80	1.12	Accepted
5.	Digital tools easy to integrate	2.22	0.95	Rejected
6.	Adequate training available	2.20	1.00	Rejected
7.	Sufficient internet connectivity	1.80	0.70	Rejected
8.	Ethical concerns about AI data privacy	1.95	0.85	Rejected

For the purpose of clarity in the interpretation of results, the mid-point of the four-response scale which was 2.5 was noted. This mid-point value was taken into consideration in the interpretation of the mean scores. When the mid-point is less than 2.5, it suggests that just few of the respondents perceived the use of AI and digital learning tools by teachers to be easy. However, when the mid-point is more than 2.5, it suggests that majority of them were of the opinion that the use of AI and digital learning tools by teachers is easy and straight forward.

Table 4 answers Research Questions 2 and 3. It indicates that the mean of each of the items except item 1, 3 and 4 are below 2.5. Also, the overall mean of all items was 2.30. This suggests that majority of the teachers were **not** of the opinion that the use of AI and digital learning tools by teachers is easy and straight forward.

Discussion of Findings

The analysis of the hypothetical data provides insightful findings regarding the attitudes of teachers and students towards AI and digital learning tools in the FCT, Abuja. In terms of Awareness, Teachers demonstrate a moderate to high level of awareness regarding digital learning tools. Teachers show a slightly higher mean for awareness of digital tools (97.5%) compared to AI tools (70.8%). This suggests that digital tools like LMS and educational apps are more commonplace in their teaching practice or professional development. This aligns with Egbunu Roseline's (2024) finding that while common digital tools like Google Search are utilized, awareness of more specialized tools might be lower.

In the case of Perceived Usefulness and Usage, Teachers strongly disagree that digital tools enhance Teachers engagements (Mean = 1.10) but that AI can personalize learning (Mean = 3.75). This corroborates the global optimistic view of AI's potential in education (Polak et al., 2022; Alenezi, 2023). These findings align with Adewole

Odeshi's (2014) conclusion about students' positive attitudes towards e-learning due to perceived usefulness. However, a significant finding for teachers is their low agreement that AI and digital tools reduce workload (Mean = 2.60). This suggests that while teachers see the pedagogical benefits, they may perceive an initial increase in their administrative burden or a lack of tools specifically designed to ease their workload, a concern also noted in the broader literature Opesemowo & Adekomaya, (2024), suggest AI can lower administrative loads, indicating a gap in current perception. Teachers, while showing more neutrality or disagreement regarding that digital tools are easy to integrate (Mean = 2.20), but moderately agreeing with the ease of use of AI tools (Mean = 2.80). This could be due to a lack of familiarity or specialized training, reinforcing the barrier identified by Eke Ogbu Eke (2024) about insufficient training.

Regarding the Factors Influencing Attitude, a critical finding impacting teachers' attitudes is the significant challenge of internet connectivity. Teachers (Mean = 1.80) largely disagree about the availability of sufficient and reliable internet, both in school and at home. This is a major impediment to digital learning adoption in Nigeria, as highlighted by numerous researchers (Thomas & Gambari, 2021; Mubangizi, 2024). Another crucial factor is adequate training. Teachers overwhelmingly perceive a lack of adequate training for AI and digital tools (Mean = 2.20). This aligns perfectly with Eke Ogbu Eke's (2024) recommendation for comprehensive training programs. Ethical concerns, particularly around data privacy, are a notable factor which the teachers (Mean = 1.95) express significant worry about the privacy of their data when using AI and online tools. This echoes the concerns raised by Hasan (2024) and Williamson and Eynon (2020) and underscores the need for robust data governance policies.

Summary

The findings from this hypothetical analysis strongly resonate with the existing literature on AI and digital learning in Nigerian education.

- The general positive attitude towards the usefulness of digital tools for engagement and personalized learning among teachers is consistent with the global optimism reported by Polak, Schiavo, and Zancanaro (2022), Alenezi (2023), and Adewole Odeshi (2014).
- The identified challenges, particularly inadequate infrastructure (internet connectivity) and insufficient training are major themes in Nigerian research, as highlighted by Thomas and Gambari (2021), Mubangizi (2024), and Eke Ogbu Eke (2024). The data underscores that these are not minor impediments but significant barriers to effective adoption.
- The teachers' perception that AI and digital tools do not necessarily reduce workload suggests a need for specific tools or training that focus on administrative efficiency, which contrasts with some of the theoretical benefits touted for AI in education (Opesemowo & Adekomaya, 2024).

- The significant worry about data privacy among respondents echoes the ethical concerns raised by Hasan (2024) and Williamson and Eynon (2020). This points to a need for clear guidelines, policies, and awareness campaigns on data security.

Conclusion

In conclusion, while there is a general willingness and a perceived usefulness of AI and digital learning tools in FCT schools, the practical implementation faces significant hurdles related to infrastructure, training, and ethical considerations. These findings underscore the need for strategic policy interventions and targeted investments to bridge the existing gaps and maximize the transformative potential of these technologies for a more inclusive and effective educational system in the Federal Capital Territory.

Recommendations

From the findings of the study, the following recommendations among others are made for the implementation of the senior secondary education curricula:

1. **Teacher Training:** Regular workshops and training programs should be organized to familiarize teachers with AI and digital tools.
2. **Infrastructure Development:** Schools should be equipped with the necessary hardware and software to support AI-based learning.
3. **Policy Implementation:** The government should develop policies to integrate AI into the national curriculum.
4. **Awareness Campaigns:** Awareness campaigns should be conducted to highlight the benefits of AI and digital learning tools.

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CHAPTER SEVENTEEN

EARLY CHILDHOOD CARE, DEVELOPMENT AND EDUCATION IN NIGERIA: POLICY EVOLUTION, ACHIEVEMENTS, CHALLENGES, AND FUTURE DIRECTIONS

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Introduction

Early Childhood Care, Development and Education represents a critical phase in the educational continuum, laying the cognitive, social, emotional, and physical foundations upon which later learning is built. The Federal Republic of Nigeria defines early childhood education as the education given prior to entry into primary school and designed to prepare children for formal schooling (Federal Republic of Nigeria [FRN], 2014).

Research across education, psychology, and neuroscience demonstrates that the first five years of life are decisive for brain development, language acquisition, and socio-emotional formation. Investment in early childhood therefore yields long-term benefits in school completion, productivity, and national development (Aiwuyo & Omoera, 2019). Globally, ECCDE is recognized not merely as a preparatory stage for schooling but as a rights-based and developmental intervention essential for building equitable societies (UNICEF, 2017). International policy frameworks—including Education for All (EFA) and Sustainable Development Goal 4—emphasize universal access to quality early childhood education as the foundation of inclusive and lifelong learning systems (UNESCO, 2020). Nigeria’s ECCDE policy trajectory reflects this global shift toward recognizing early childhood as a strategic investment in human capital.

Conceptual Foundations of ECCDE

Early childhood refers to the period from birth to approximately age five, characterized by rapid neurological growth and heightened responsiveness to environmental stimulation. During this stage, adequate nutrition, health care, protection, and early learning experiences strongly influence later academic achievement and social competence.

ECCDE is a holistic construct that integrates education, health, nutrition, protection, and psychosocial care. This integrated perspective distinguishes ECCDE from narrower notions of preschool education by emphasizing the total development of the child (UNICEF, 2017). Imam (2012) underscores that early childhood education must be understood within a socio-cultural and policy context, arguing that sustainable ECCDE systems depend on coherent national planning, community participation, and professional capacity-building. This perspective reinforces the need for ECCDE to function as a cross-sectoral developmental strategy rather than a stand-alone educational service.

Historical Evolution of ECCDE Policy in Nigeria

Pre-colonial and missionary foundations: Prior to Western education, indigenous Nigerian societies practiced community-based child-rearing systems in which moral instruction, vocational exposure, storytelling, and socialization occurred within extended family structures. These informal systems emphasized character formation, responsibility, and cultural continuity (Akinbote & Alhassan, 2011). Organized early childhood education began with Christian missionaries in the nineteenth century through nursery classes and Sunday schools designed primarily for evangelization but which later evolved into structured preschool learning environments.

Post-independence developments: Formal recognition of pre-primary education emerged in the 1977 National Policy on Education, which categorized nursery education as an integral, though non-compulsory, part of the education system (FRN, 1977). Despite this recognition, government involvement remained minimal, and provision was dominated by private individuals and voluntary agencies.

Policy Integration Era (2000s onward): A major policy shift occurred in the early 2000s as Nigeria aligned with global education reforms:

- The **Child Rights Act (2003)** affirmed children's rights to survival, development, and protection.
- The **Universal Basic Education Act (2004)** incorporated pre-primary education into the basic education framework.
- The **National Policy on Integrated Early Childhood Development (2007)** adopted a multi-sectorial approach combining education, health, nutrition, and social protection.

These initiatives marked Nigeria's transition from fragmented provision to a holistic child-development strategy.

Institutionalization of One-Year Pre-Primary Education

The integration of one-year compulsory pre-primary education into the formal structure expanded Nigeria's system to the **1–6–3–3–4** model. This reform signaled growing recognition of school readiness as a national priority and positioned ECCDE as the foundation of basic education.

Policy Achievements in ECCDE Implementation

Increased policy recognition and legal framework: ECCDE is now firmly embedded in Nigeria's education architecture through policy instruments such as:

- National Policy on Education (revised editions)
- National Minimum Standards for Early Child Care Centres
- Early Learning and Development Standards
- UBE implementation guidelines for pre-primary education

These frameworks provide regulatory direction and signal sustained governmental commitment.

Expansion of access: Nigeria has witnessed steady growth in ECCDE Centres, largely driven by urbanization, rising parental awareness, and demand for early learning opportunities. Although expansion has been uneven, it reflects increasing societal recognition of ECCDE's value.

Adoption of a multi-sectoral model: Nigeria's ECCDE approach aligns with global best practice by integrating services across education, health, and welfare sectors. This reflects the understanding that child development outcomes depend on coordinated interventions rather than isolated schooling initiatives.

Alignment with global development agenda: ECCDE reforms in Nigeria are closely aligned with global commitments to inclusive and equitable education, particularly as articulated by UNESCO under Sustainable Development Goal 4 (SDG 4), which calls for ensuring that all girls and boys have access to quality early childhood development, care, and pre-primary education so that they are ready for primary schooling (UNESCO, 2020). This alignment reflects a growing recognition that educational inequalities often originate before children enter formal schooling; therefore, investing in ECCDE serves as a preventive strategy for addressing disparities related to socio-economic status, gender, disability, and geographic location. Furthermore, ECCDE aligns with global evidence emphasizing that early interventions yield some of the highest returns in human capital development. Investments in nutrition, stimulation, and early learning enhance cognitive capacity and workforce readiness, ultimately supporting poverty reduction and sustainable economic growth. International development partners such as UNICEF have consistently highlighted ECCDE as a cornerstone for breaking intergenerational cycles

of disadvantage by ensuring that vulnerable children receive comprehensive support during their most formative years (UNICEF, 2017).

Rationale for Early Childhood Care, Development and Education in Nigeria

Early Childhood Care, Development and Education (ECCDE) is widely regarded as the foundational stage of the education system and a critical entry point for achieving national and global education goals. As the first level of basic education, ECCDE provides the essential groundwork for lifelong learning, human capital formation, and the realization of inclusive development. Investment in early childhood is therefore not only a social obligation but also a strategic developmental choice, as resources committed to young children yield long-term educational, economic, and societal returns (Assoumani, 2023).

Early childhood represents a unique developmental period during which physical, cognitive, emotional, and social growth occurs more rapidly than at any other stage of life. Experiences during these formative years significantly shape future learning capacity, behaviour, and well-being. High-quality ECCDE programmes create stimulating environments that nurture curiosity, creativity, and early problem-solving abilities, thereby maximizing children's developmental potential (Mwaipopo et al., 2021). Research evidence further demonstrates that skills acquired in early childhood are strongly associated with later academic success, productivity, and social adjustment, underscoring the long-term value of early educational interventions (Nold et al., 2021).

Participation in pre-primary education has also been shown to enhance school readiness and improve performance in primary school. Children exposed to structured early learning opportunities tend to demonstrate stronger literacy, numeracy, and socio-emotional competencies than those without such experiences, thereby increasing their chances of completing basic education successfully. Conversely, deprivation or poor-quality early experiences can undermine the developmental foundations necessary for later achievement, reinforcing cycles of disadvantage.

Recognizing these realities, Nigeria's National Policy on Education outlines ECCDE objectives such as ensuring a smooth transition from home to school, preparing children for primary education, inculcating social and moral values, stimulating creativity and enquiry through play, and developing cooperation, good habits, and foundational cognitive skills (FRN, 2014). The policy further mandates government to regulate standards, promote teacher training, encourage private sector participation, adopt mother-tongue instruction, and emphasize play-based methodologies appropriate to young learners.

ECCDE is also closely linked to the concept of school readiness, which reflects a child's preparedness physically, socially, emotionally, and intellectually, to engage in formal learning. Achieving this readiness requires collaboration between families, schools, and communities to ensure continuity between home experiences and classroom expectations.

To strengthen implementation and address earlier fragmentation in service delivery, the Federal Government, in collaboration with UNICEF, developed the National Minimum Standards for Early Child Care Centres in 2007 to harmonize practices, improve quality assurance, and provide operational guidelines for stakeholders (Odiagbe, 2015). These efforts highlight Nigeria's recognition of ECCDE as both a child's right and a national investment essential for sustainable development, social stability, and educational advancement.

Persistent Challenges in ECCDE Policy Implementation

Despite notable policy advances and increased recognition of Early Childhood Care, Development and Education (ECCDE) as a critical component of Nigeria's education system, the translation of policy intentions into effective practice continues to face structural, financial, and institutional constraints. These challenges are interconnected and collectively limit the effectiveness, equity, and sustainability of ECCDE programmes nationwide (Imam, 2012).

Inadequate funding and resource allocation: A major obstacle to ECCDE implementation is insufficient and inconsistent public funding. Although ECCDE has been incorporated into the Universal Basic Education framework, financial allocations to pre-primary education remain disproportionately low relative to other levels of education. This underinvestment affects the construction of purpose-built facilities, procurement of age-appropriate instructional materials, provision of play equipment, and maintenance of safe learning environments. As a result, many public ECCDE centres depend on improvised resources that constrain experiential and play-based pedagogies essential for holistic development (FRN, 2014; UNICEF, 2017).

Inequitable access and urban–rural disparities: Access to ECCDE services remains uneven across geographic and socio-economic divides. Urban centres enjoy a higher concentration of facilities, while rural and underserved communities face limited availability. The dominance of private providers has further widened inequality, excluding children from low-income households who are most in need of early learning opportunities. This inequity undermines national goals of inclusive education and perpetuates developmental gaps that extend into later schooling (UNESCO, 2020).

Shortage of qualified ECCDE personnel: The ECCDE workforce is characterized by shortages of professionally trained educators. Many caregivers lack specialized

preparation in early childhood pedagogy, child psychology, and play-based instructional methods. Weak professionalization pathways, limited incentives, and inadequate in-service training reduce the attractiveness of ECCDE as a career field, ultimately affecting the quality of care, stimulation, and learning experiences available to young children (Imam, 2012; UNICEF, 2017).

Weak implementation and monitoring mechanisms: While policy frameworks and operational guidelines exist, enforcement mechanisms remain weak. Regulatory supervision of ECCDE centres—especially privately operated ones—is inconsistent, resulting in wide disparities in quality, safety standards, and curriculum implementation. Additionally, fragmented data systems hinder effective planning, monitoring, and evaluation of ECCDE outcomes (FRN, 2014).

Limited attention to the 0–3 age cohort: Policy implementation has historically focused on children aged 3–5, with insufficient provision for infants and toddlers. Services such as parental education, early stimulation, nutrition support, and community-based childcare are underdeveloped, despite evidence that the earliest years are the most critical for brain development and long-term learning capacity (UNICEF, 2017).

Fragmented inter-sectoral coordination: ECCDE requires collaboration across education, health, nutrition, and social protection sectors. However, weak coordination among responsible agencies often leads to duplication of efforts, policy overlap, and inefficient service delivery. Without clearly defined governance structures, integrated child development remains difficult to operationalize at scale (Imam, 2012).

Cultural perceptions and limited public awareness: In some communities, ECCDE is still viewed primarily as custodial care rather than a structured developmental intervention. Such perceptions reduce enrolment and limit parental engagement. Public awareness initiatives have not yet sufficiently emphasized the developmental and lifelong benefits of early learning (UNESCO, 2020).

Inadequacy of infrastructural facilities: Infrastructural deficits constitute a major barrier to quality ECCDE delivery. Many centres operate in overcrowded classrooms, temporary structures, or spaces originally designed for older pupils. The absence of child-sized furniture, safe sanitation facilities, outdoor play areas, and stimulating learning environments restricts opportunities for exploration and interactive learning. These conditions undermine programme effectiveness and raise concerns about safety, inclusivity, and developmental appropriateness. Empirical findings indicate that infrastructural inadequacies significantly constrain quality assurance and equitable service delivery across ECCDE centres (Ohaeri, 2025).

Prospects for Strengthening ECCDE in Nigeria

Addressing these persistent challenges requires strategic reforms aimed at repositioning ECCDE as the cornerstone of Nigeria's education and human development agenda.

Integration with competency-based education reforms: Nigeria's shift toward competency-based education presents an opportunity to embed foundational competencies from the earliest years. ECCDE programmes can cultivate creativity, collaboration, communication, and critical thinking through play, inquiry, and discovery-based learning. Aligning early childhood curricula with national competency frameworks will strengthen continuity between pre-primary and primary education and support lifelong learning trajectories (UNESCO, 2020).

Expansion of public provision: Greater government participation in ECCDE delivery is essential to reduce dependence on private providers and ensure equitable access. Establishing ECCDE centres within public primary schools—particularly in rural and disadvantaged communities—would broaden participation, standardize quality, and reaffirm ECCDE as a public responsibility central to national development (FRN, 2014).

Professionalization of the ECCDE workforce: Improving ECCDE quality requires deliberate investment in workforce development. Teacher education institutions must expand specialized training programmes in early childhood education, inclusive pedagogy, and child development. Clear certification pathways, improved remuneration, and continuous professional development will enhance professional status and attract qualified personnel (Imam, 2012).

Strengthening monitoring and quality assurance: Robust accountability systems are needed to ensure consistent standards across ECCDE centres. Strengthening inspection services, developing reliable data systems, and enforcing national minimum standards will support evidence-based planning and improve service delivery (FRN, 2014; UNICEF, 2017).

Enhanced community and parental engagement: Families and communities are indispensable partners in early childhood development. Policies should promote parent education, community-based early learning initiatives, and stronger home–school collaboration. When caregivers actively support early stimulation, nutrition, and socio-emotional development, children experience greater continuity between home and school environments, leading to improved long-term outcomes (UNICEF, 2017)

Conclusion

ECCDE in Nigeria has evolved from informal, community-based childcare practices into a nationally recognized component of the basic education system. Policy

milestones—including the National Policy on Education, the UBE Act, and the Integrated Early Childhood Development framework—demonstrate significant progress in institutional recognition. However, translating policy aspirations into equitable, high-quality practice remains an ongoing challenge. Sustained funding, professional capacity development, effective coordination, and stronger public provision are essential for realizing ECCDE's transformative potential. Investing in ECCDE is not merely an educational reform but a national development imperative capable of strengthening human capital, reducing inequality, and securing Nigeria's socio-economic future.

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CHAPTER EIGHTEEN

IMPLEMENTATION OF SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) EDUCATION: CHALLENGES AND WAY FORWARD

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Introduction

Education remains one of the most powerful instruments for national development, social transformation, and economic growth. Around the world, curricula are being redesigned to meet the demands of technologically driven, knowledge-based societies. Modern economies increasingly require graduates who are not only academically sound but also innovative, adaptable, and capable of solving real-world problems. In this context, Science, Technology, Engineering, and Mathematics (STEM) education has gained global prominence as a strategy to equip learners with critical skills for the 21st century. Many countries have launched national STEM initiatives in response to global competitiveness challenges and workforce demands, emphasizing STEM from early childhood through higher education. For example, reports indicate that by 2030 the world could face a shortage of tens of millions of skilled STEM professionals if education systems do not keep pace. Investments in STEM education are therefore seen as investments in future economic prosperity and innovation capacity (UNESCO, 2024).

Nigeria, the most populous nation in Africa, exemplifies both the potential and challenges of implementing STEM education. With over 41% of Nigeria's population under the age of 15, the country has a vast youth demographic whose talents could drive economic growth if properly nurtured (PRB, 2025). Nigeria's education system comprising basic (primary and junior secondary), senior secondary, and tertiary levels has produced many professionals, yet it struggles with quality and resource gaps. Educational expenditure remains very low relative to GDP; in 2022, Nigeria spent only 0.35% of its GDP on education far below the global average of about 4.1% and the UNESCO benchmark of 4–6% (UNESCO UIS, 2023). This underinvestment has resulted in shortages of schools, teachers, and learning materials. Many Nigerian schools, especially in rural areas, lack electricity, laboratories, and internet connectivity, and this impedes effective STEM teaching. Despite these challenges, policymakers recognize STEM as a strategic priority.

The Nigerian government recently overhauled the national curriculum (branded “Lighter Load, Stronger Minds”) to reduce subject overload and emphasize skill development in

areas like digital literacy and vocational training (Federal Ministry of Education, 2025). The new curriculum, rolling out in 2025/2026, introduces compulsory Digital Technology courses and streamlines trade subjects such as solar technology and computer hardware, aligning education with global best practices and labour market needs.

In summary, Nigeria sees STEM education as a vital tool for addressing developmental challenges from unemployment to technological backwardness. However, effective implementation faces significant obstacles related to funding, teacher preparation, infrastructure, and alignment with industry needs. This paper examines the meaning of STEM education, how it is implemented in schools, its importance for national development, the challenges confronting its implementation in Nigeria, and practical strategies (the “way forward”) for strengthening STEM education in the country. The discussion situates Nigeria’s experience within global STEM education trends and highlights what can be learned from international best practices.

Meaning of STEM Education

STEM education refers to an integrated, interdisciplinary approach to teaching and learning that combines the four domains of Science, Technology, Engineering, and Mathematics. Rather than teaching these subjects as isolated disciplines, STEM education emphasizes their interconnections and real-life applications. The goal is to develop learners’ problem-solving ability, critical thinking, creativity, and innovation skills through hands-on and inquiry-based experiences. STEM education moves learners away from rote memorization toward active learning in meaningful contexts. Cognitive scientists note that students learn more deeply when they can apply knowledge to solve problems, converting inert information into generative knowledge that is retained over time (Johnson, 1989).

Definition and Scope of STEM Education

Different scholars and organizations have defined STEM education in complementary ways. A common definition by the U.S. National Science Foundation (NSF) frames STEM education as the preparation of students in competencies and skills in the four disciplines and the application of those competencies to real-world problems. Tsupros describe STEM education as “an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons” as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, and work.

Each component of STEM contributes a unique perspective: science builds understanding of natural phenomena through observation and experimentation; technology focuses on tools and systems to meet human needs; engineering applies

scientific and mathematical principles to design and build solutions; and mathematics provides the language of quantitative reasoning and logical analysis. When taught together, these fields reinforce each other. For example, a robotics project in a classroom integrates engineering design, coding (technology), mathematical logic, and scientific principles of electronics and physics. This integration is at the heart of STEM pedagogy.

Historical Evolution of STEM Education

The concept of integrating science and mathematics education is not entirely new. Educators have long recognized the value of cross-disciplinary teaching. However, the specific term “STEM” gained prominence in the early 21st century. It is widely reported that the acronym STEM was popularized by the U.S. National Science Foundation around 2001, evolving from an earlier term “SMET”. The push for STEM education was catalyzed by concerns over national competitiveness and innovation. In the United States, landmark reports like “Rising Above the Gathering Storm” warned that a shortage of scientists and engineers would imperil economic leadership. Similar concerns echoed globally, leading to initiatives such as the European Union’s STEM agendas in the 2000s and China’s massive investment in STEM fields in its education system. Over the past two decades, many countries have embedded STEM priorities in their national education standards, curricula, and funding. For instance, by 2020 more than 60 countries had developed formal policies to promote STEM education at the K-12 level.

Global organizations have influenced STEM education policies. UNESCO and the United Nations emphasize STEM as a driver for achieving development goals and advocate for inclusive STEM education that reaches girls and disadvantaged groups. The African Union, recognizing the importance of STEM for the continent’s future, adopted a Continental Education Strategy (CESA 2016–2025) that highlights science and technology. In Nigeria, STEM-oriented reforms date back to curriculum revisions in the 1980s when Integrated Science was introduced at junior secondary schools and Introductory Technology became part of basic education. These were early attempts to break the silo approach. More recently, Nigeria’s Vision 20:2020 and related policy documents have underscored science and technology education as key to national development.

Disciplinary Integration and STEM Models

A hallmark of STEM education is the integration of disciplines. Integration can occur along a spectrum. On one end, multidisciplinary approaches teach science, math, and other subjects around a common theme but still maintain distinct courses. At a deeper level, interdisciplinary approaches blend the subjects into a single learning experience (for example, a project or course that fully fuses math and science content). There are several models of implementing integrated STEM: subject integration, problem-based

integration, and STEM laboratories or centers. In subject integration, a teacher might incorporate mathematics into a science lesson (or vice versa) to highlight connections. Problem-based integration centers instruction on real-world challenges for instance, designing a water purification system involves chemistry (science), fluid dynamics (engineering), cost analysis (mathematics), and perhaps coding sensors (technology).

An emerging model globally is the creation of STEM schools or academies that use specialized curricula. These schools often employ project-based learning across subjects and sometimes team-teach with multiple instructors from different disciplines. Another model is adding the arts to STEM (STEAM) to foster creativity, though STEAM remains debated in some academic circles. Nigeria's curriculum has elements of integration at the basic level: the latest overhaul merges basic science and technology into one learning area in primary and junior secondary levels. This integration is meant to give students a foundational STEM experience before they specialize in distinct science subjects (Physics, Chemistry, Biology and so on) at the senior secondary level. There have also been calls to integrate entrepreneurship and design thinking into STEM in Nigeria, aligning with global trends that emphasize innovation and Maker Education (UNESCO, 2024).

Global Policy Influence on STEM Education

Global developmental agendas have reinforced the importance of STEM. The United Nations 2030 Agenda for Sustainable Development explicitly or implicitly ties STEM capacity to several Sustainable Development Goals (SDGs). Notably, SDG 4 (Quality Education) and SDG 9 (Industry, Innovation and Infrastructure) are directly advanced by strengthening STEM education. STEM fields also underpin progress on goals related to health (SDG 3), clean energy (SDG 7), climate action (SDG 13), and more. UNESCO has highlighted that STEM education is instrumental in achieving the Sustainable Development Goals, particularly those related to education, innovation, and inequality (UNESCO, 2025). In Africa, unequal access to STEM education has been identified as a factor exacerbating economic disparities between the continent and the rest of the world.

International partnerships and policy frameworks often guide national STEM initiatives. For example, Nigeria's participation in the UNESCO STEM Education Project and collaboration with organizations like the African Union and World Bank bring in technical support and funding for STEM program (such as training teachers or equipping laboratories). Furthermore, global benchmarking and rankings create pressure for policy action. Awareness of how countries like South Korea or Finland have transformed their economies through STEM-focused education reforms has influenced Nigerian policymakers and educators. There is also a growing network of conferences and

exchanges on STEM (the 2024 Addis Ababa Continental Conference on Transforming STEM in Africa, for instance) that spread best practices.

In summary, the push for STEM education in Nigeria is not occurring in isolation, it is part of a worldwide movement recognizing STEM literacy as essential for all citizens in the modern era.

Implementation of STEM Education in Schools

Implementing STEM education in schools requires translating theory into practice, bringing interdisciplinary, hands-on, and inquiry-based approaches into classrooms, school programmes, and national curricula. This often demands a significant pedagogical shift from traditional, teacher-centered methods to more dynamic, learner-centered approaches that foster experimentation, collaboration, and creativity. Nigeria's education landscape, with its diversity of contexts, presents unique challenges and opportunities in this regard. Some of the key approaches to STEM implementation in Nigerian schools include:

Inquiry-Based Learning (IBL): Inquiry-Based Learning (IBL) encourages students to ask questions, explore problems, and investigate real-world phenomena much like scientists and engineers. Rather than receiving facts passively, students actively construct knowledge through observation, experimentation, and reasoning. For example, a biology teacher might ask students to investigate the effects of different soil types on plant growth. Students would formulate hypotheses, design experiments, collect and analyze data, and draw conclusions. In Nigeria, applying IBL has shown positive results despite significant resource constraints. Some schools make creative use of local materials for experiments such as using everyday kitchen ingredients for chemistry demonstrations or constructing simple circuits using batteries and wires. Case studies have shown that when Nigerian students participate in such inquiry activities, their engagement and understanding improve dramatically compared to rote memorization methods. However, IBL in Nigeria is hampered by large class sizes, lack of science laboratories, and limited teacher training. Many teachers are unfamiliar with the inquiry process or are overburdened, making it difficult to guide students through open-ended investigations. Professional development and teacher support are thus essential for scaling up IBL.

Project-Based Learning (PBL)

Project-Based Learning (PBL) involves students in extended tasks that integrate multiple STEM domains, often culminating in a tangible product or solution. Projects simulate real-world challenges like designing a simple irrigation system, building a weather station, or programming a mobile app and develop both content knowledge and skills like teamwork and problem-solving.

In Nigerian schools, PBL has found fertile ground in science fairs, robotics competitions, and co-curricular STEM clubs. For instance, students in Lagos have built water filtration

systems using local materials, combining chemistry, biology, and engineering. In other schools, students have participated in designing solar-powered chargers or simple AI chatbots, supported by NGOs or private sector partners.

Despite these successes, PBL is not yet widespread. Most schools lack the flexibility in their timetables or assessment structures to support extended project work. In many cases, exams are still focused on recall rather than application, which discourages PBL. However, ongoing curriculum reforms in Nigeria especially the “Lighter Load, Stronger Minds” policy—seek to make more room for such approaches.

Integration of Digital and Technological Tools

Digital tools such as simulations, online laboratories, coding platforms, and educational games can transform STEM learning, especially where physical resources are limited. Virtual science laboratories allow students to simulate experiments that they otherwise could not conduct due to lack of equipment. Coding tools like Scratch or Python can be used to teach logic and problem-solving in engaging ways.

Nigeria has taken important steps in this direction. The updated curriculum introduces Digital Technology as a core subject in senior secondary schools and emphasizes ICT skills across grade levels. Federal and state governments, with partners like UNICEF and private firms, have started providing devices, solar-powered laboratories, and offline digital content to underserved schools.

Nonetheless, the digital divide remains stark. According to recent statistics, less than 25% of Nigerian schools have reliable internet access, and many lack power. In rural areas, digital learning is still a distant dream. Closing this gap requires investment in infrastructure and training, as well as development of offline digital solutions tailored to local contexts.

Curriculum and Instructional Reform

Curriculum plays a vital role in shaping the implementation of STEM education. Nigeria's recent curriculum reform aims to reduce subject overload and promote more focused, practical learning. Trade subjects like computer hardware, solar technology, and digital media have been introduced alongside traditional science courses. This gives students opportunities to apply theoretical knowledge to marketable skills.

Instructionally, many schools are experimenting with blended learning combining direct instruction with group work, digital tools, and contextual examples. In places like Abuja and Lagos, some secondary schools now offer STEM "project periods" where interdisciplinary themes are explored collaboratively.

Challenges remain in aligning instructional practices with curriculum intent. Teachers often revert to lecture-based methods, especially when facing high-stakes external exams that reward rote knowledge. Therefore, reforms need to be accompanied by teacher guides, assessment changes, and supportive leadership at the school level.

Co-Curricular STEM Activities

STEM learning is increasingly supported by co-curricular activities like science clubs, robotics competitions, coding hackathons, mathematics olympiads, and STEM fairs. These initiatives help students explore STEM beyond the textbook and build skills such as creativity, teamwork, and communication.

In Nigeria, organizations like the Science Teachers Association of Nigeria (STAN), the Young Innovators of Nigeria, and NGOs such as STEM Cafe run popular events that reach thousands of students annually. The “Catch Them Young” science contest and the NNPC science quiz are examples of efforts that spark early interest in STEM.

These activities are especially valuable for exposing students from underprivileged backgrounds to opportunities they might not otherwise encounter. Expanding and institutionalizing them—by including them in school calendars and budgets—can make them more inclusive and impactful.

Global Case Studies in STEM Implementation

Around the world, diverse countries have implemented successful strategies to promote STEM education. These case studies offer important lessons Nigeria can adapt to its local context. The examples below highlight policy innovation, infrastructure investment, teacher training, and inclusive pedagogy that have led to tangible improvements in STEM outcomes.

Rwanda: Strategic National Investment and Curriculum Overhaul

Rwanda stands out in Africa for its deliberate national push toward STEM-driven development. Since 2015, the government has made STEM education central to its Vision 2020 and subsequent policies, investing heavily in infrastructure, teacher training, and technology access.

Key initiatives include:

1. A competency-based curriculum introduced in 2019 that emphasizes STEM, ICT, and inquiry-based teaching.
2. The establishment of STEM-focused schools with well-equipped laboratories and trained teachers.
3. Partnerships with global tech companies like Microsoft to introduce coding and robotics.

4. The creation of the Rwanda Coding Academy a specialized school preparing youth for careers in software engineering.

Importantly, Rwanda allocated up to 15% of its national budget to education in some years, significantly above Nigeria's 0.35% of GDP. The results are visible: science performance has improved, girls' enrollment in STEM has increased, and Rwanda is now seen as a model for STEM implementation in Sub-Saharan Africa (UNESCO, 2024).

Vietnam: Focused Reforms Yielding High PISA Scores

Vietnam offers a compelling example of a lower-middle-income country achieving global success in STEM through focused reforms. Despite modest resources, Vietnam ranked among the top-performing countries in science and mathematics in the 2015 and 2018 PISA assessments.

Vietnam's key strategies included:

1. A strong national focus on basic skills in literacy and numeracy, particularly in rural and disadvantaged regions.
2. High standards for teacher training, with regular in-service development and a rigorous recruitment process.
3. Practical science instruction even at the primary level, supported by local textbook production and low-cost teaching aids.

Vietnam's experience demonstrates that strategic investment in teacher quality, curriculum coherence, and rural inclusion can drive rapid gains in STEM learning even in resource-constrained settings.

Singapore: Applied Learning Programmes and Industry Partnerships

Singapore consistently ranks among the top global performers in mathematics and science. A hallmark of its success is the Applied Learning Programme (ALP), launched in 2014, which embeds STEM themes like robotics, clean energy, and biotechnology into secondary school curricula.

Features of the programme include:

1. Project-based learning linked to real-world issues.
2. Close collaboration with universities and industry for mentorship and internships.
3. Dedicated funding for STEM labs and teaching aids.
4. A national focus on continuous teacher development and data-driven decision making.

Singapore's experience shows the value of linking classroom learning with economic sectors and future workforce needs a strategy that Nigeria can emulate to reduce graduate unemployment and better align education with industry demand.

South Korea: STEAM Integration and Creativity Emphasis

South Korea implemented a national STEAM education policy in 2011, adding the “A” for Arts to stimulate creativity alongside scientific rigour. Over 400 STEAM model schools were created, and teacher training centers were established nationwide.

Key takeaways include:

1. Integrating design thinking and creative problem-solving in STEM instruction.
2. Government-funded STEAM teacher workshops and materials.
3. Interdisciplinary project assessments that evaluate innovation, not just correctness.

This model is relevant for Nigeria's goals of fostering innovation and entrepreneurship. It also shows how including art and design can make STEM more engaging for diverse learners, especially girls.

These international examples reinforce several success factors Nigeria can adopt:

1. High-level political commitment and consistent funding.
2. Teacher professional development and support networks.
3. Public-private partnerships with technology and industrial sectors.
4. Integration of hands-on, inquiry-based learning and real-world projects.
5. Inclusion and equity policies that reach rural areas and disadvantaged learners.

The Importance of STEM Education

STEM education has far-reaching implications beyond the classroom. It is a catalyst for economic growth, environmental sustainability, technological innovation, and social development. For Nigeria, where unemployment, poverty, and infrastructural gaps persist, strengthening STEM education is critical to unlocking human capital and preparing for future challenges.

Economic Growth and Employment Opportunities

A strong STEM foundation supports a country's ability to compete in the global economy. According to the United Nations (2020) countries that invest in STEM consistently produce a more innovative and productive workforce.

1. **Job creation:** Fields like data science, AI, biotechnology, and renewable energy are growing rapidly. In Nigeria, sectors such as fintech and agritech are expanding, creating demand for skilled STEM professionals.
2. **Entrepreneurship:** STEM education promotes problem-solving and creativity, equipping students to build startups and microenterprises (Okebukola, 2017).

3. **Economic diversification:** Reducing dependency on oil and transitioning to knowledge-driven industries depends on a STEM-literate workforce.

Addressing Climate Change and Sustainable Development

STEM education equips learners with the tools to tackle global challenges such as environmental degradation, food insecurity, and clean energy transition.

1. Nigeria's vulnerabilities to desertification and flooding make it imperative to train professionals who can design adaptive infrastructure, develop renewable energy solutions, and conduct scientific research (UNESCO, 2025).
2. STEM also underpins multiple Sustainable Development Goals (SDGs), including SDG 7 (clean energy), SDG 9 (infrastructure and innovation), and SDG 13 (climate action).

National Security and Technological Sovereignty

Nations with robust scientific and engineering capabilities are better positioned to secure their borders, manage public health emergencies, and participate in global diplomacy. During the COVID-19 pandemic, countries with strong STEM sectors responded more effectively by producing PPEs, diagnostics, and data-driven policies. In the era of cybersecurity and digital warfare, Nigeria must build indigenous technological expertise to protect its data infrastructure and sovereignty.

Empowerment and Social Inclusion

STEM opens pathways for marginalized populations, especially girls and youth in rural communities.

- **Women in STEM:** Increasing girls' participation can close gender gaps in employment and income (UNDP, 2022).
- **Youth empowerment:** STEM skills help young people become active problem-solvers, not just job seekers.
- **Indigenous innovation:** Integrating local knowledge with STEM can generate home-grown technologies tailored to Nigeria's needs.

Enhancing Critical Thinking and Civic Engagement

Beyond technical knowledge, STEM nurtures skills like analytical thinking, collaboration, and resilience essential for democratic societies. Citizens with STEM literacy are better equipped to make informed decisions about public health, environmental policy, and technology ethics. Project-based STEM education fosters

teamwork and a sense of agency, allowing students to contribute meaningfully to their communities.

Challenges in STEM Education Implementation in Nigeria

While STEM education holds immense promise for national development, Nigeria faces several structural, institutional, and socio-economic challenges that hinder its effective implementation. Understanding these obstacles is essential to designing solutions that are both practical and scalable.

Inadequate Infrastructure and Learning Resources

A large proportion of Nigerian schools lack the basic facilities needed for effective STEM teaching. Over 60% of public secondary schools lack functional science laboratories or up-to-date equipment (Shaibu). Many schools lack electricity or internet connectivity, especially in rural areas. Science and technology classes are often delivered without demonstrations or hands-on activities, undermining conceptual understanding. These deficits create a theory-heavy learning environment and prevent students from engaging in real experimentation or technological exploration.

Shortage of Qualified STEM Teachers

The demand for skilled STEM educators far exceeds supply. Many schools employ underqualified or non-specialist teachers to fill STEM subject positions. Teacher education programmes often lack practical training in inquiry-based or interdisciplinary teaching (Abdulahi, 2024). Professional development is sporadic, underfunded, or outdated, leaving teachers unfamiliar with modern pedagogies or technologies. This results in over-reliance on rote learning and limits innovation in the classroom.

Gender Disparity and Socio-Cultural Barriers

Persistent gender norms and socio-economic inequalities restrict access to STEM education. Girls are underrepresented in physics, engineering, and ICT tracks at the secondary and tertiary levels (UNESCO, 2017). Early marriage, family expectations, and school-related gender-based violence discourage girls' sustained participation. Children with disabilities and those from rural, low-income backgrounds face added barriers in accessing STEM learning opportunities. This undercuts national efforts to harness the full potential of its population.

Poor Alignment between Education and Industry

The current STEM curriculum does not fully reflect the skills and competencies required by employers. Students graduate with limited exposure to real-world problem-solving or emerging technologies like AI or data analytics. Collaboration between educational institutions and industries is minimal. Internship opportunities, mentorship programmes,

and innovation hubs are still rare, especially in public schools. This mismatch contributes to graduate unemployment and stifles innovation.

Weak Policy Implementation and Funding Constraints

Despite the presence of ambitious policy documents, implementation remains uneven due to inadequate budgetary allocations (education spending in Nigeria remains below 1% of GDP) (Federal Ministry of Education, 2025), over-centralization of decision-making with little room for state-level innovation, frequent changes in leadership, leading to inconsistent or abandoned reforms.

Way Forward: Strategies for Strengthening STEM Education in Nigeria

To overcome the multifaceted challenges outlined earlier and unlock the transformative potential of STEM education, Nigeria must adopt a comprehensive, inclusive, and forward-looking strategy. Below are practical, evidence-based recommendations:

Increase Investment in STEM Infrastructure: Allocate a higher percentage of the national and state education budgets to science and technology facilities, equip every secondary school with at least a basic science laboratory, computer laboratory, and internet access, leverage public–private partnerships (PPPs) to support infrastructure upgrades (e.g., solar-powered ICT laboratories in rural areas). This will ensure all students regardless of location or socio-economic status have access to hands-on learning.

Expand and Professionalize STEM Teacher Training: Revamp teacher education programmes to emphasize STEM integration, inquiry-based instruction, and use of digital tools, Institutionalize continuous professional development through workshops, online courses, and teacher learning communities, offer incentives such as rural service bonuses, housing, and career advancement for qualified STEM teachers. This will build a competent teaching workforce capable of delivering modern STEM pedagogy.

Integrate Indigenous Knowledge and Local Contexts: Contextualize STEM teaching by incorporating indigenous technologies, farming practices, and environmental knowledge, promote bilingual instruction or use of local languages to aid comprehension, particularly in rural settings. This increases relevance, student engagement, and cultural validation.

Foster Gender and Social Inclusion

- Implement policies and programmes that encourage girls' participation in STEM (like, scholarships, girls-only STEM clubs, female mentorship).
- Provide assistive technologies and inclusive resources for students with disabilities.

- Target interventions to reach marginalized areas and reduce urban–rural disparities.
- This ensures that STEM education benefits all learners equitably.

Strengthen School–Industry Linkages

- Partner with tech companies, engineering firms, and research institutions to offer student internships, mentoring, and project competitions.
- Involve industry professionals in curriculum design to ensure alignment with labor market needs.
- Create innovation hubs or STEM incubators within schools or communities.

This bridges the gap between education and employability, stimulating entrepreneurship and innovation.

Implement Curriculum Reforms and Project-Based Learning

1. Shift focus from rote memorization to hands-on, problem-solving learning through project-based and inquiry-driven models.
2. Encourage schools to adopt interdisciplinary teaching and allow flexible scheduling for STEM projects.
3. Include 21st-century topics (AI, climate science, robotics, coding) within the formal curriculum.

This helps students develop transferable skills applicable to real-world challenges.

Monitor, Evaluate, and Scale Successful Models

1. Establish robust systems for data collection on STEM teaching quality, student engagement, and equity indicators.
2. Support pilot projects in selected schools, evaluate impact, and scale up effective practices.
3. Disseminate case studies and best practices across regions to promote peer learning among educators.

This ensures that reform is evidence-based and continuously improving.

Conclusion

STEM education is not a luxury, it is a necessity for national transformation. For Nigeria to compete in a fast-evolving global economy, tackle pressing developmental challenges, and empower its large youth population, it must urgently and strategically invest in STEM education. This paper has outlined the definition, importance, current

implementation status, challenges, and global case studies of STEM education. It also offered actionable recommendations tailored to Nigeria's context. While progress has been made such as the national curriculum overhaul and various STEM-focused pilot programs systemic issues like poor funding, teacher shortages, and inequitable access persist. Moving forward, STEM education must be treated as a national priority with political backing, adequate financing, and collaborative execution. If Nigeria sustains its focus, innovates in pedagogy, and leverages partnerships, it can produce a new generation of scientists, engineers, technologists, and innovators with individuals equipped to solve local problems and contribute to global solutions.

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CHAPTER NINETEEN

EDUCATION INDUSTRY AND THE LABOUR MARKET DEMAND CRISIS: GLOBAL DYNAMICS AND THE NIGERIAN EXPERIENCE

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Introduction

This chapter explores the relationship between Nigeria's expanding tertiary education sector and the persistent labour market demand crisis. Despite growth from fewer than ten universities in 1970 to over 250 by 2023, youth unemployment and underemployment remain high, with over 35% of young Nigerians affected. Employers report widespread deficiencies in critical thinking, communication, digital literacy, and technical skills, highlighting a misalignment between educational outputs and labour market needs. Structural constraints including curriculum rigidity, governance fragmentation, demographic pressures, and slow industrial transformation exacerbate the skills mismatch. Drawing lessons from global best practices, the chapter emphasizes the need for demand-driven education policies. Recommended strategies include embedding employer-led practical training, revitalizing technical and vocational education, mainstreaming digital competencies across disciplines, promoting lifelong learning through micro-credentials and modular courses, and clarifying institutional mandates to strengthen system coherence. Establishing real-time labour market intelligence systems is also crucial for evidence-based enrolment and curriculum planning.

Education as a driver of development

Across the globe, education has long been positioned as the principal mechanism for economic mobility, productivity growth, and national development. The expansion of mass education systems after World War II, particularly in the tertiary sector, reflected a widespread belief that higher education enhances individual earnings and contributes to national economic growth (Becker, 1993). Scholars have noted that tertiary education produces not only human capital but also social capital, innovation, and civic capacity, which are critical drivers of economic and social development (Hanushek & Woessmann, 2020). Consequently, governments around the world invested heavily in expanding universities, technical colleges, and polytechnics, aiming to equip citizens with the knowledge and skills necessary for modern economies (Darvas & Palmer, 2014).

However, in the twenty-first century, a persistent paradox has emerged. Despite increasing educational attainment, labour markets have not uniformly absorbed graduates, and the correlation between years of schooling and employment outcomes has weakened in many developing countries. This “skills mismatch” or “employment paradox” reflects not only macroeconomic constraints but also structural challenges in aligning educational curricula with labour market needs. While education expands, the quality, relevance, and employability of graduates often lag behind the dynamic demands of contemporary economies (Brown, Lauder, & Ashton, 2010; Okwudili, 2024).

Nigeria exemplifies this tension in striking terms. According to the (Odusote, 2023), the country has witnessed exponential growth in tertiary institutions, expanding from fewer than ten universities in 1970 to over 250 universities, alongside a growing number of polytechnics and colleges of education by 2023. Enrolment growth has mirrored this institutional expansion, with the student population in universities increasing from approximately 60,000 in 1970 to over 2.5 million in 2023 (Odusote, 2023). Despite these gains, labour force statistics from the National Bureau of Statistics indicated persistent youth unemployment, underemployment, and significant engagement in informal work. Recent reports suggest that over 35% of Nigerian youths aged 15–34 are unemployed or underemployed, reflecting both cyclical and structural economic challenges. (Sinclair, 2025)

Employer associations including the Nigeria Employers’ Consultative Association (Aina, 2023) report significant deficits in job-ready competencies among graduates. Employers consistently highlight gaps in critical thinking, communication, digital literacy, and technical skills (Adedeji, 2022). This juxtaposition of graduate unemployment with widespread skills shortages underscores that the problem is not a

simple oversupply of graduates but a misalignment between educational outputs and labour market demands (Okwudili, 2024).

At the same time, these challenges must be situated within broader global transformations. The rise of the knowledge economy, the digital revolution, and the proliferation of artificial intelligence have redefined the skill requirements for twenty-first-century workforces worldwide. Countries that have successfully leveraged tertiary education to drive economic growth have done so not merely by expanding access but by ensuring relevance, quality, and innovation in teaching and learning (Hanushek & Woessmann, 2020; Brown et al., 2010). In contrast, Nigeria's labour market demand crisis reflects domestic structural constraints, including inadequate industrial diversification, weak investment in technical and vocational education, governance inefficiencies, and demographic pressures from a rapidly growing youth population (Darvas & Palmer, 2014; Ogwo, & Ezekoye, 2020).

Institutional capacity constraints exacerbate the problem. Many universities and polytechnics operate with limited infrastructure, under-qualified teaching personnel, and insufficient funding to provide industry-aligned training. Research by Joshua, Azuh, & Olanrewaju, (2015) highlights that while Nigerian tertiary institutions produce high enrolments; practical training, internships, and research–industry collaborations remain underdeveloped. This shortfall diminishes graduates' employability and contributes to the persistent unemployment–skills gap paradox.

This chapter situates Nigeria's education and employment challenges within both global and national contexts, foregrounding empirical realities while linking them to international debates on human capital, employment, and skills development (Psacharopoulos & Patrinos, 2018). By analysing the interplay between educational expansion, quality assurance, and labour market alignment, the chapter advances the argument that resolving graduate unemployment in Nigeria requires coordinated interventions in curriculum reform, governance strengthening, and enhanced institutional capacity (Adedeji, 2022). The analysis underscores that policy prescriptions cannot rely solely on increasing access to education; they must also enhance relevance, quality, and the responsiveness of education systems to labour market demands (Aina, 2023).

Theoretical and Conceptual Foundations

Human Capital Theory: This chapter is anchored on the Human Capital Theory (Becker, 1993; Schultz, 1961), which conceptualizes education as an investment that yields productivity and earnings. Empirical research confirms positive wage differentials associated with higher education globally (Psacharopoulos & Patrinos,

2018; Hanushek & Woessmann, 2020). In Nigeria, tertiary education graduates typically earn more than individuals with only secondary education (Adedeji, 2022).

However, this theoretical framework presupposes relatively stable occupational structures and predictable returns. In volatile economies characterized by rapid technological change and uneven industrialization, returns become heterogeneous. Nigerian graduates in engineering and medicine often secure stronger labour outcomes than those in mass-enrolment disciplines such as business administration or sociology (Joshua, et al 2015). This unevenness reflects labour demand asymmetries rather than intrinsic disciplinary value.

Skills Ecosystem Perspective: The skills ecosystem model (Brown et al., 2010) frames alignment as an outcome of systemic coordination among educational institutions, employers, regulatory bodies, and labour market intermediaries. Mismatch occurs when these actors operate in silos. Nigeria's fragmented governance architecture spanning ministries of education, labour, industry, youth development, and technology limits coherent strategic planning. While universities maintain academic autonomy, structured employer participation in curriculum design remains inconsistent. As a result, feedback loops between labour demand and educational supply are weak (Okwudili, 2024; Adedeji, 2022).

Labour Market Signalling and Credential Inflation: Spence's (1978) signalling theory emphasizes the informational function of educational credentials. In contexts of expanding tertiary participation, degree inflation may occur. Nigerian public sector recruitment increasingly requires bachelor's degrees for roles previously accessible to diploma holders. This escalation raises barriers to entry without necessarily enhancing productivity (Okwudili, 2024). Credential inflation contributes to underemployment, as graduates accept roles below their qualification level to secure income.

Structural Transformation and Employment Elasticity: Development theory highlights structural transformation, the shift from agrarian to industrial and service-based economies as central to employment expansion (Tregenna, Nell, Callaghan, Fooster-McGregor, Szirmai, & Verspagen, 2021). Nigeria's economic trajectory has been constrained by oil dependency, limited manufacturing growth, and infrastructure deficits. The employment elasticity of growth remains low; GDP increases do not proportionately generate jobs. Thus, educational expansion occurs within an economy lacking adequate absorptive capacity.

Global Dynamics of Labour Market Demand Crisis: Global labour markets are increasingly influenced by technological transformation, including digitalization, artificial intelligence, and automation. In advanced economies, these shifts heighten

demand for analytical thinking, technological literacy, and adaptability. Countries such as Germany and Switzerland have successfully aligned educational outputs with labour market needs through employer-integrated apprenticeship systems and institutionalized industry participation, reducing skill mismatch (OECD, 2022). In contrast, many emerging economies including those in Sub-Saharan Africa experience a persistent mismatch as tertiary education expansion outpaces industrial diversification (Brown et al., 2010). Nigeria exemplifies this trend: rapid growth in university enrolments has not been matched by corresponding manufacturing or industrial development, leading to graduates who face limited employment opportunities despite increased educational attainment (Adediji, (2022).

Advanced Economies: Advanced economies leverage structured collaboration between education and industry to meet evolving skill demands. Employer-integrated apprenticeship models and dual vocational systems in countries like Germany and Switzerland ensure graduates acquire competencies directly aligned with labour market requirements.

Emerging Economies: In emerging economies, the expansion of tertiary education has largely been supply-driven. Nigeria, for example, has expanded university enrolments rapidly, particularly in non-technical disciplines, but industrial growth and job creation have lagged, creating a persistent skills mismatch and graduate underemployment (Brown et al., 2010; Adediji, 2022).

Nigeria's Education Expansion and Labour Market Outcomes

Tertiary Education Growth: The liberalization of university licensing in the early 2000s led to a surge in private sector participation, increasing the number of universities from 62 in 2000 to over 174 by 2023, including 99 private institutions (Odusote, 2023). Enrolment grew from approximately 660,000 in 2000 to over 2.5 million students in 2022, with business administration, social sciences, and humanities programs accounting for nearly 60% of enrolment (Odusote, 2023). Engineering, technology, and STEM programs expanded more slowly due to infrastructure and laboratory cost constraints, reflecting only about 18% of total enrolment. While access widened, rapid expansion outpaced quality assurance mechanisms, resulting in inconsistencies in teaching standards, laboratory facilities, and faculty qualifications ((Joshua, et al 2015). For example, less than 40% of engineering laboratories across federal and state universities meet the minimum accreditation standards of the National Universities Commission (Odusote, 2023).

Graduate Unemployment and Underemployment: National Bureau of Statistics reports indicate that unemployment among post-secondary graduates stands at 21.1%, exceeding the 17.3% rate for those with only primary education. This paradox reflects

skill mismatch rather than an absolute shortage of trained personnel. Surveys show that nearly 65% of graduates engage in informal economic activities such as trading, ride-hailing, or microenterprise operations, highlighting a structural absorption deficit. The informal sector dominates Nigeria's employment landscape, accounting for over 90% of total employment and contributing just 48% to GDP, indicating low productivity and limited skill utilization (Nwangwu & Onah, 2019).

Employer Skill Gap Assessments: Employer surveys by the Nigerian Employers Consultative Association (NECA) reveal that 72% of firms perceive recent graduates as deficient in critical soft skills, particularly communication, teamwork, problem-solving, and digital literacy. Over 68% of companies report conducting post-recruitment training programs to bridge these gaps (Adedeji, 2022). Evidence from the Lagos State industrial sector shows that approximately 40% of graduates in technical roles required at least three months of supplementary skills training to meet operational standards.

Industrial Training Fund and SIWES: The Students Industrial Work Experience Scheme (SIWES), overseen by the Industrial Training Fund (ITF), aims to integrate academic and workplace learning. Participation increased from 112,000 students in 2010 to over 410,000 in 2022. Despite its strategic importance, structural challenges persist: only 58% of students secure placements in organizations matching their field of study, and supervision ratios often exceed 1:30, reducing mentorship effectiveness (Joshua, et al 2015).

Sectoral Labour Market Dynamics in Nigeria

Oil and Gas Sector: Nigeria's oil sector remains capital-intensive and highly mechanized, employing roughly 100,000 directly and about 250,000 indirectly (Darvas & Palmer, 2014). Employment is concentrated in specialized technical roles, including petroleum engineering, geosciences, and process safety, often requiring international certifications. The high capital-to-labour ratio limits graduate absorption in traditional engineering fields, even as global oil prices fluctuate.

ICT and Digital Economy: Nigeria's digital ecosystem is one of the fastest-growing in Africa, with over 100 tech hubs and approximately 2,500 active startups in 2023 (OECD, 2022). The fintech sector alone has raised more than \$1.2 billion in venture funding over the past five years. Employers increasingly favor alternative certifications, coding bootcamps, and professional short courses over traditional degree programs, highlighting a curricular lag in universities. Skills in cybersecurity, data analytics, artificial intelligence, and cloud computing are in particularly high demand, with vacancy-to-candidate ratios exceeding 3:1 in Lagos and Abuja tech clusters.

Agriculture and Agro-Processing: Agriculture engages over 35% of Nigeria's workforce but contributes only about 22% of GDP due to low mechanization and limited technological adoption (Ogwo, & Ezekoye, 2020). Agro-processing and modern agribusiness require knowledge of precision agriculture, supply chain management, and ICT-enabled farm monitoring—areas inadequately addressed in most tertiary programs. University graduates entering agribusiness often rely on short-term workshops rather than degree-level training to meet sectoral needs.

Manufacturing: Nigeria's manufacturing sector employs approximately 8% of the formal workforce, constrained by unreliable electricity, high import dependence, and weak industrial policy (World Bank, 2016). Even technically skilled graduates in mechanical, electrical, and industrial engineering face underemployment, as domestic firms lack capacity to absorb significant numbers of STEM graduates. Energy-intensive industries operate below 45% of installed capacity, further limiting labour demand.

Structural Drivers of the Demand Crisis

Curriculum Rigidity: University program reviews typically occur every 5–10 years, lagging behind rapid technological and market shifts. Curricula remain largely theoretical, with less than 15% of course hours devoted to experiential learning, internships, or problem-based projects (Okwudili, 2024). This misalignment reduces graduate readiness for emerging sectors such as fintech, digital marketing, and green technologies.

Weak Labour Market Intelligence Systems: Nigeria lacks integrated real-time occupational forecasting. The National Skills Qualification Framework is underutilized, and data on labour demand are fragmented across agencies (Adedeji, 2022). Consequently, enrolment planning is not systematically linked to projected skill needs, resulting in oversupply in social sciences and humanities while technical fields remain understaffed.

Demographic Pressure: Nigeria's youth population exceeds 90 million, with approximately 3 million graduates entering the labour market annually (Sinclair, 2025). Universities produced nearly 500,000 graduates in 2022 alone, outpacing formal sector absorption and intensifying competition in informal employment.

Governance Fragmentation: Multiple agencies including NUC, ITF, NBTE, and SMEDAN operate with overlapping mandates and weak interagency coordination. This fragmentation leads to inconsistent programme accreditation, uneven quality assurance, and inadequate alignment between tertiary outputs and labour market requirements (Ejiogu & Sule, 2019).

Socio-Economic Consequences

The labour market misalignment generates substantial social and economic costs:

1. **Brain Drain:** Between 2010–2022, an estimated 250,000 skilled graduates migrated annually to OECD countries.
2. **Graduate Underemployment:** Over 60% of university graduates occupy informal sector roles, limiting productivity (Nwangwu & Onah, 2019).
3. **Credential Inflation:** Increasing educational attainment without corresponding job opportunities escalates competition and reduces signalling value of degrees (Spence, 1978).
4. **Youth Disillusionment:** Rising frustration correlates with higher incidences of social unrest and political apathy among urban youth (Adedeji, 2022). The opportunity cost of underutilized human capital is estimated at over 3% of GDP annually.

Strategic Pathways towards Alignment

Differentiated Institutional Mandates: Restoring clear functional differentiation among universities, polytechnics, and colleges of education enhances labour market signalling. Polytechnics could focus on technical skills with high employability outcomes, while universities maintain research-intensive programs (Adedeji, (2022; Joshua, et al 2015).

Revitalizing Technical and Vocational Education: Investment in competency-based training, dual apprenticeship systems, modern equipment, and instructor professional development can reposition TVET as a viable pathway for economic transformation. Social rebranding is essential to enhance perception and uptake among youth (Brown et al., 2010).

Employer-Integrated Curriculum Design: Continuous employer engagement in curriculum design ensures relevance and responsiveness to labour demand. Evidence shows firms that co-design programs see 30–40% faster graduate readiness and reduced onboarding costs (Adedeji, 2022) ; Okwudili, 2024).

Digital Competency Mainstreaming: Embedding digital literacy, coding, data analytics, and ICT tools across disciplines improves graduate adaptability in both formal and informal sectors, addressing the skills gap revealed by NECA and other surveys.

Lifelong Learning Architecture: Stackable micro-credentials, recognition of prior learning, flexible delivery modalities, and public–private financing mechanisms support continuous upskilling. The emergence of over 150 accredited online professional

platforms in Nigeria demonstrates feasibility and growing adoption (Psacharopoulos & Patrinos, 2018).

Reframing the Education Industry: Nigeria's education industry must transition from supply-driven expansion to demand-responsive planning embedded in national economic strategy. Linking funding and accreditation to graduate employability outcomes can incentivize alignment. Evidence from governance and higher education reforms underscores how institutional restructuring and policy coordination shape system performance and accountability (Anugwom, 2002). However, sustained improvement requires measurable outcome-based funding mechanisms that directly connect institutional performance to labour market results. Pilot performance-oriented initiatives in selected states have reported improvements in employment outcomes, suggesting that funding incentives can strengthen graduate employability.

Conclusion and Recommendations

Nigeria's labour market demand crisis stems from structural economic constraints, governance fragmentation, and rapid technological change. Despite the expansion of tertiary education, industrial transformation has lagged, resulting in credential growth without corresponding employment opportunities.

To address the mismatch:

- University Vice-Chancellors and academic deans should collaborate with industry partners to embed practical training and employer-relevant skills in programs.
- The Minister of Education and TVET institution directors should implement competency-based curricula and formal apprenticeship schemes.
- Faculty members across disciplines should incorporate foundational and advanced digital competencies into teaching.
- University and polytechnic management teams should develop modular courses and micro-credential programs for continuous upskilling.
- The National Universities Commission (NUC) and the National Board for Technical Education (NBTE) should clarify the mandates of universities, polytechnics, and colleges of education to reduce overlap and strengthen specialization.
- The Ministry of Labour and the National Bureau of Statistics should establish real-time occupational data systems to inform enrolment and curriculum planning.

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