TOWARDS DIGITALIZATION OF SECONDARY EDUCATION IN NIGERIA: CHALLENGES AND PROSPECTS

BY

Eche, Patrick Inalegwu[1], Isaiah Agama Egiri[2] & Emmanuel Ajaka John[1]
[1]Department of Biology Education, Federal College of Education, Odugbo, Benue State- Nigeria
[2]Department of Computer Science Education, Federal College of Education, Odugbo-Benue State, Nigeria
Email: patrichinalegwueche@mail.com | emmyprosper85@gmail.com | isaiahegiri@fceodugbo.edu.ng

Abstract

Secondary education as a second tier of Education in Nigeria occupies a unique position. Apart from laying a solid foundation for subsequent higher education, it also provides a platform for making vocational choices. With current development in Information and Communication Technology and its associated benefits, the shift towards digitalization in Education sector and particularly secondary school education in Nigeria is non-negotiable. It therefore follows, that the conventional knowledge and skill transmission strategies currently employed in our secondary schools are fast becoming obsolete. The paper focuses on the challenges and prospects of digitalization of secondary education in Nigeria. The concept of digitalization was explained, which entails the innovative use of digital tools in teaching and learning processes. The objectives of secondary education and the need for secondary education digitalization were x-rayed. Some challenges hindering implementation of digitalization and its prospects were discussed. It was suggested that Government should show more commitment to digital education by investing in infrastructure, actionable policy development, e.t.c. if the goals and objectives of secondary education must be achieved in this 21st century.

Keywords: Digitalization, Challenges, Prospects, Secondary, Education

Introduction

Education is seen as the fulcrum around which meaningful developments revolve. The technological, economic and political levels of development of any country is a function of its educational system. Education is described as the transformative power in an era defined by expeditious technological advancement and unprecedented global challenges (Adejo,2023). The knowledge, skills and values that are necessary ingredients for development are acquired through education. It is therefore, a veritable sector for development that should be periodically evaluated for the purpose of its relevance in addressing country's multifaceted challenges. The worth of any educational system as an investment, lies in its capacity to serve its beneficiaries particularly the students, parents, employers of labour, and the society in general (Ijaiya, 2014). Education is fundamental in human existence as it empowers individuals to make informed decisions and improve their quality of life. It plays a crucial role in economic and social development by providing requisite knowledge. skills and values. The success stories of countries such as Japan, Russia and China that achieved remarkable progress through focused investment in education underscores the transformative power of a well-articulated educational system (Litvilova, 2015).

In the 21st century, digital transformation has become a pivotal force reshaping educational systems globally. The world is witnessing Fourth Industrial Revolution (4IR) characterized by utilization of technology as a learning platform where all previously automated instructional materials are manipulated to achieve learning objectives (Isa & Ojetunde,2019). The integration of digital technologies into education is revolutionizing the way students learn and educators teach, thereby offering improved accessibility, enhanced learning outcomes, and cost efficiency

(Edugist, 2024). The role of education in the development of any nation cannot be over emphasized. The knowledge and skills gained through education are indispensable for national growth.

In Nigeria, popular amongst 4IR education technologies are the online learning platforms (Ojetunde & Ramnarain,2023) and the push towards digitalizing secondary education is driven by the need to bridge educational disparities and align with global educational standards. The Nigerian government has recognized the importance of digital education in its National Digital Economy Policy and Strategy, aimed at enhancing digital literacy and infrastructure across the country. However, the journey towards fully digitalized secondary education in Nigeria is fraught with challenges such as inadequate infrastructure, limited access to digital devices, insufficient teacher training, and socio-economic disparities that hinder equitable access to digital resources. Moreover, resistance to change and lack of awareness about the benefits of digital education further impede progress.

Despite these challenges, there are significant prospects for digitalizing secondary education in Nigeria. The potential benefits include personalized learning experiences, improved student engagement, and the development of critical digital skills necessary for the modern workforce. Embracing digital education can also facilitate inclusive learning, reaching students in remote areas. (Suleiman & Umejiaku, 2023). This study therefore, explores the challenges and prospects of digitalizing secondary education in Nigeria, providing insights and suggestions that will advance the nation's educational landscape.

Concept of Digitalization

Digitalization in a broader term refers to the process of using digital technologies to transform and improve business processes, operations, and services by leveraging digital tools and platforms. Digitalization in education refers to the integration of digital technologies to enhance teaching, learning and administrative processes. Digitalization involves the innovative integration of modern technologies and digital tools to enhance teaching and learning while creating opportunities for remote access to educational content (Akinyemi, Amaechi, & Etoh, 2022). It encompasses the conversion of analog information such as printed educational items into digital forms, thereby producing digital surrogates that replicate the original physical materials. It is a systematic process of transforming traditional, paper-based instructional materials into electronic formats that can be stored, accessed, and manipulated using digital technologies. Ibezin (2013), further described digitalization as the application or integration of internet-based systems to deliver educational content, skills, and knowledge using a flexible, structured approach. This form of learning accommodates both synchronous and asynchronous modes, supporting instruction and training across time and geographical boundaries. The digitalization of education in Nigeria encompasses a continuum of practices from digitizing content to restructuring pedagogy for online and blended learning environments. Although the nation has made strides, substantial gaps remain in infrastructure, policy, and practice that must be addressed to ensure widespread and sustainable digital education, especially at the secondary level

Digitalization extends beyond the mere conversion of materials but also involves rethinking pedagogy to leverage the advantages of ICT for improved learning outcomes. Although the use of digital technology in Nigerian education is often considered a recent development, digital learning has historical roots. The integration of information and communication technologies (ICT) in education began shortly after Nigeria’s independence (Ajadi, Salawu, & Adeoye, 2008). Notable initiatives included the Nigeria Broadcasting Corporation's educational radio programmes in the 1960s targeted at primary and secondary schools, and the University of the Air programme introduced by Ahmadu Bello University in 1972 (Mac-Ikemenyina, 2005). Despite these early efforts, traditional methods of teaching still dominate across Nigeria’s secondary and tertiary institutions. Kazeen (2020), observed that chalk-and-talk pedagogy remains the standard in many schools, even as technology-based alternatives are becoming popular. Nevertheless, initiatives such as the National Open University of Nigeria (NOUN) have introduced digitalized course delivery formats using web-based modules, printed materials, audio-visual resources, and CD-ROMs (Mac-

Ikemenyina, 2005), signifying a gradual shift towards digital learning in Nigeria's educational landscape. Digital learning is made possible by technology using different methods such as online classes, social learning. virtual meetings, -reality ads, online exams and blended learning (FRN, 2023). However, the level of digitalization in Nigerian education remains relatively low when compared with global standards. Multiple factors, including resistance to change, lack of infrastructure, and inadequate digital literacy, are considered common factors hindering the transition to technology-enhanced learning models (Kazeen, 2020).

The COVID-19 pandemic significantly accelerated the urgency of digital adoption in education. Social distancing mandates and prolonged school closures exposed the vulnerabilities of conventional learning models and highlighted the necessity of digital solutions. The pandemic underscored the importance of enabling students to access lessons remotely, allowing teachers to assess and interact with learners digitally, and ensuring continuous access to educational materials and information. The impact of COVID-19 on the education sector was far-reaching as it disrupted formal educational services and emphasized the need to search and embrace alternative to traditional learning system. As reported in global literature, over 290 million students worldwide were directly affected by school closures at the height of the pandemic (FRN,2023). The COVID-19 pandemic therefore, has not only disrupted the steady operation of the traditional teaching mode but rather brought the urgent demand for leveraging digital learning as alternative mode of delivering quality education (Adamu,2023) In this context, digital learning has not become the last option but a critical necessity for continuity in education delivery. Though digital education had existed in Nigeria before the pandemic, it was not in popular use as government did not show sincere commitment by adopting it as alternative means of instruction delivery.

Secondary School Education in Nigeria

Secondary education in Nigeria refers to the stage of formal education that occurs after primary education and before tertiary education. It serves as a bridge between these two levels, laying a critical foundation for both higher academic pursuits and vocational development. Historically, secondary education in Nigeria was modeled after the British system, especially before the 20th century. This system was primarily aimed at preparing individuals for leadership roles within the society. However, over time, it became evident that this model was insufficient in meeting the broader national development goals of Nigeria. Consequently, the structure, duration, type, and curriculum content of secondary education have undergone several reforms (James & Obinne, 2013).

In Nigeria, secondary education is broadly categorized into two types: General Secondary Schools which prepare students for tertiary education and; Technical and Vocational Secondary Schools which equip students with practical skills, enabling them to engage in gainful employment upon graduation. This dual structure allows students to either continue into higher education or enter the workforce, depending on their interests and aptitudes. Secondary education occupies a unique and strategic position in the Nigerian educational system. It is not only a preparatory stage for tertiary education but also a platform for vocational decision-making and skill acquisition. This makes it essential for producing well-rounded individuals who can contribute meaningfully to national development.
Secondary education in Nigeria is a vital component of the educational system, providing the necessary link between basic and higher education. Its significance extends beyond academics to national development through human capital formation, skill development, and economic empowerment.

Objectives of Secondary Education in Nigeria

The National Policy on Education (NPE) outlines the official objectives of secondary education in Nigeria. According to the Federal Republic of Nigeria (FRN, 2014), the broad goals of secondary education are to prepare individuals for:

1. Useful living within the society, and

2. Higher education.

To achieve these goals, the policy specifies that secondary education shall:

1. Provide all primary school leavers with the opportunity for education of a higher level, irrespective of sex, social status, religious or ethnic background.
2. Offer diversified curriculum to cater for the differences in talents, opportunities and future roles.
3. Provide trained manpower in the applied sciences, technology, and commerce at sub-professional grades.
4. Develop and promote Nigerian languages, art and culture in the context of the world's cultural heritage.
5. Inspire students with a desire for self-improvement and achievement of excellence.
6. Foster national unity with an emphasis on the common ties that unite us in our diversity.
7. Raise a generation of people who can think for themselves, respect the views and feelings of others, respect the dignity of labour, and appreciate those values specified under the broad national goals.
8. Provide technical knowledge and vocational skills necessary for agricultural, industrial, commercial, and economic development.
9. Promote the physical, emotional, and psychological development of all children.

As lofty as these objectives are, many are yet to be achieved probably because of the educational system.

The Need for Digitalization of Secondary Education in Nigeria

In the context of educational reform, the demand for digital transformation has become increasingly critical, especially in light of contemporary global trends and local systemic deficiencies. Prior to the COVID-19 pandemic, Nigeria's educational system was widely perceived as outdated and ill-equipped to drive the country toward the technological advancement needed for national development. As James et al. (2013) rightly observed, the system lacked the structural and instructional dynamism to match 21st-century global educational standards.
The outbreak of the COVID-19 pandemic, which disrupted academic activities globally, served as a catalyst for educational reform. In Nigeria, traditional learning mode which was suspended for several months, further exacerbated the inadequacies of the conventional educational system and this underscores the urgent need for digital alternatives. This period revealed a glaring gap in digital access and readiness, emphasizing the importance of equipping both teachers and learners with digital tools and resources for effective remote learning.

Digital education offers numerous advantages over traditional methods. It has revolutionized teaching and learning by making educational experiences more mobile, interactive, and engaging. Learners' attention spans can be increased, and their appetite for continuous learning sustained through multimedia content and adaptive instructional strategies. Furthermore, digital education promotes inclusivity and flexible learning pathways, enabling individuals to work and learn simultaneously a trend increasingly relevant in modern economies. It is noted that if digitalization is not achieved, the existing inequalities in education in the new normal will likely increase and new ones may arise (FGN,2023). Government's commitment is therefore underpinned by the understanding that 21st century learning demands innovative pedagogical approach and integration of ICT (Adejo, 2023).

Globally, digitalization has become an integral component of educational reform, and Nigeria must align with this trajectory to ensure its relevance in the global knowledge economy. Integrating Information and Communication Technology (ICT) into education enhances learners' cognitive development and fosters innovation (Akiyemi, et al (2022). They emphasized, that curriculum delivery in a digital environment supports the development of critical thinking, creativity, and problem-solving skills essential for national competitiveness. Moreover, the pandemic laid bare the global digital divide, with over two-thirds of children worldwide lacking access to digital learning tools. In Nigeria, this divide further marginalizes disadvantaged groups, making the case for digital equity even more

compelling. Bridging this gap through the digitalization of secondary education is essential for fostering digital literacy and ensuring that students acquire the skills needed to thrive in the 21st-century digital economy.

The 21st century has witnessed rapid technological advancement, fundamentally altering information processing and societal modernization. These shifts impose new demands on education, requiring the integration of modern technological innovations into teaching and learning processes. As Ibenzin (2013) noted, digital education leverages the internet and a flexible delivery model whether synchronous or asynchronous to support the acquisition of knowledge and skills in a way that transcends traditional limitations of infrastructure or course type.
Digitalization, therefore, is not only about educational strategy but a national imperative. It provides an innovative approach to teaching, impacting the quality of didactic and methodological practices. Hristovska and Jovanova-Milkova (2009), highlighted that digital learning redefines content delivery, where instructional tasks are executed through digital platforms, enhancing both teaching efficacy and learner autonomy.
To meet the demands of a globally competitive economy, Nigeria must prioritize the quality of its teachers and the methods they employ. A digitally competent teaching force is indispensable for the effective implementation of digital secondary education.

Digital Tools

Consequent of the positive impact of technology on educational process, overtime, various educational tools are designed which serve to achieve digital learning in an optimal way. Today there are various digital tools that can be used to influence the way of planning, implementation and evaluation of teaching and learning. Digital learning is oriented towards the student as the central person of teaching. Students become more active, they determine the time, place, pace of learning and gain experiences through digital resources. Self-directed processes of acquiring knowledge are considered to be the main feature because the student with the help of the internet and Tech- devices creates a view of the world and acquires the necessary skills for life. On the other hand, the role of the teacher has changed as his control during learning decreases as everything is left to the student and his independent work (Pandel, 2021). The teacher therefore, becomes an advisor, organizer of the teaching process, an expert in the field of using technology in order to achieve optimal educational results and continuous professional development. Considering the characteristics of digital learning, it can be concluded that it is currently the best learning paradigm and strategy for modern education (Elculleda Encarncion et al, 2021) that is considered as one of the greatest achievements of the century.

Digital learning tools are type of tools whose primary purpose is the development and application of digital teaching content in teaching practice. They enable the planning, implementation and evaluation of teaching, the establishment of communication as well as the design of creative and stimulating teaching materials for most students. Web tools are only new teaching aids that promote and motivate effective learning in a web environment (Juric et al, 2014.). Technically, these are programming languages that allow the user to create and share certain contents via Internet (Maric & Aleksic Minic, 2016). In the pedagogical sense the tools meet all didactic requirements (Novalic & Novalic, 2018), and can be used at all levels of education and during all stages of the teaching process (Teofilovic & Isailovic, 2020). Digital tools do not fulfill purpose in themselves, but they are aids to teacher in the class room and the teaching environment. Their essence is reflected in the development of potentials and digital competencies of students, and more importantly in providing full mental engagement. In that way, skills for lifelong learning are created, which is considered the basic aspiration of modern education.

Key Digital Tools for Secondary Education and Their Characteristics

1. Google Classroom

Google Classroom is a free web-based educational platform developed by Google, designed to streamline the process of sharing files between teachers and students. It allows educators to create, distribute, and grade assignments digitally. The platform supports communication, feedback, and organization of course content in a centralized space, accessible via smartphones or computers. It is particularly useful in monitoring learning activities in distance education, supporting structured lesson delivery and collaboration (Dimitrijevic, 2021).

2. Google Meet

Google Meet is a secure, video conferencing application that enables virtual classroom sessions. It requires a Google account and internet access and supports real-time interaction through audio, video, and screen-sharing features. It is widely used in synchronous teaching sessions for delivering lectures, conducting discussions, and organizing parent-teacher meetings.

3. Zoom

Zoom is a widely adopted video conferencing tool that facilitates interactive remote learning. With a free tier supporting up to 100 participants, it offers features such as breakout rooms, screen sharing, virtual whiteboards, and real-time chat. According to Minhas et al. (2021), Zoom is effective in reducing feelings of isolation in online learning environments, enhancing student engagement, and enabling collaborative tasks, key components for successful digital education.

4. Microsoft PowerPoint

PowerPoint is a widely used presentation tool that allows the creation of multimedia-enhanced instructional content. It supports the integration of text, audio, video, charts, animations, and transitions to facilitate visually engaging learning materials. It is one of the most accessible and commonly used tools in Nigerian schools. Similar platforms like Google Slides provide equivalent functionality for cloud-based collaboration (Novali & Novali, 2018).

5. Google Forms

Google Forms is an easy-to-use tool for administering assessments, surveys, and feedback forms. Teachers can create quizzes and automatically grade student responses. It facilitates real-time data collection, making it useful for tracking student understanding, engagement, and learning progress (Dimitrijevic, 2021).

6. Kahoot! Kahoot! is an interactive learning platform used to create game-based quizzes. It fosters active participation and is effective for formative assessments. It allows teachers to assess knowledge retention in a fun and engaging way, especially useful for younger secondary school learners (Wang, 2015).

7. Edmodo. Edmodo is a learning management system (LMS) designed specifically for K-12 education. It allows teachers to share content, assign quizzes, track progress, and communicate with students and parents in a secure environment. It promotes social learning and collaboration within a controlled classroom space (Trust, 2017).

8. WhatsApp. While not originally designed for education, WhatsApp has become a practical tool for communication and learning in resource-constrained settings like Nigeria. It is used to share notes, voice messages, and videos, particularly when access to formal LMS platforms is limited (Okoye & Nwajiuba, 2021).

9. YouTube. YouTube serves as a repository for instructional videos. Teachers can curate or create video lessons and share links with students for self-paced learning. The platform supports visual learning and is especially helpful in delivering tutorials, experiments, and how-to lessons across subjects.

10. Padlet. Padlet is a digital canvas where teachers and students can collaborate by posting texts, images, links, and videos. It encourages creativity, brainstorming, and collective participation in classroom discussions.

Challenges of Digitalized Education in Nigeria

1. Epileptic Power Supply

The irregular power supply in Nigeria continues to hamper the effective deployment and sustainability of ICT infrastructure in schools (Oyeniran et al., 2020).

2. Poor Internet Connectivity and High Cost of Access
   Many schools, especially in rural areas, are excluded from digital opportunities due to poor broadband infrastructure and the high cost of internet services
3. Inadequate ICT Infrastructure in Schools
   The lack of ICT facilities and digital tools in most secondary schools remains a major challenge to the implementation of digital education in Nigeria (Aduwa-Ogiegbaen & Iyamu, 2005).
4. Limited Digital Literacy Among Teachers and Students
   Teachers often lack adequate training in digital pedagogy, making it difficult to integrate technology into teaching and learning
5. Unpreparedness of Educational Institutions
   The sudden shift to online learning exposed the unpreparedness of many Nigerian institutions in terms of infrastructure, capacity, and planning
6. Lack of Curriculum Reform for Digital Integration
   There is a clear mismatch between Nigeria's traditional curriculum and the digital competencies required in a technology-driven world
7. Shortage of Skilled Technical Support Staff
   The effective operation of digital learning systems requires skilled technical staff, which many schools in Nigeria do not have. The present efforts of allowing teachers to attend a one- week- computer training is far from being adequate in the modern classrooms (Moemeke, 2019)
8. Socioeconomic Barriers and Digital Inequality
   Poverty continues to hinder access to digital devices and internet among students, widening the digital divide (Adeoye et al., 2020).
9. Urban-Rural Disparity in Digital Access
   Digital education in Nigeria is unevenly distributed, with rural areas suffering limited access to ICT tools and internet connectivity (Ifinedo, 2017).
10. Policy Gaps and Weak Implementation Frameworks
    Although ICT policies exist, lack of funding and political will have hindered effective implementation in the education sector (Nwachukwu et al., 2020).

Lack of advocacy for inclusiveness in the existing learning method which equally exclude support for the blind with inability to communicate through mail or electronic media that require sight and paucity of research sincerely dedicated to design the program that will mitigate the challenges.

Prospects of Digitalization of Secondary Education

The digitalization of secondary education in Nigeria presents numerous opportunities to enhance learning outcomes, bridge educational disparities, and prepare students for the demands of the 21st-century knowledge economy. Some prospects include:

1. Enhanced Access to Quality Education
   Digital platforms enable students, especially those in remote and underserved areas, to access a wealth of educational resources beyond traditional textbooks. This democratization of information can significantly reduce educational inequalities.
2. Personalized and Adaptive Learning

Technology facilitates personalized learning experiences by allowing students to learn at their own pace and according to their individual learning styles. Adaptive learning systems can identify students' strengths and weaknesses, providing tailored content to address specific needs.

3. Improved Student Engagement and Motivation
   Interactive digital tools, such as educational games, simulations, and multimedia content, can make learning more engaging and enjoyable. This increased engagement can lead to better retention of information and higher academic achievement.
4. Development of Digital Literacy and 21st-Century Skills
   Integrating digital technologies into education equips students with essential digital literacy skills, critical thinking, problem-solving abilities, and collaboration skills. These competencies are vital for success in the modern workforce.
5. Teacher Empowerment and Professional Development
   Digital tools can support teachers by providing access to a vast array of teaching resources, facilitating collaboration with peers, and offering opportunities for continuous professional development through online courses and workshops
6. Efficient Assessment and Feedback Mechanisms
   Technology enables the use of online assessments and real-time feedback, allowing educators to monitor student progress effectively and adjust instruction accordingly. This timely feedback can help identify learning gaps and improve student outcomes
7. Promotion of Inclusive Education
   Digitalization can support inclusive education by providing assistive technologies for students with disabilities, ensuring that all learners have equal opportunities to succeed.
8. Facilitation of Lifelong Learning
   Digital platforms offer opportunities for lifelong learning, enabling students to continue their education beyond the classroom and adapt to the evolving demands of the global economy.
9. Strengthening of Public-Private Partnerships
   The digitalization of education opens avenues for collaboration between the government, private sector, and non-governmental organizations to invest in infrastructure, develop innovative educational solutions, and expand access to quality education.
10. Acceleration of National Development Goals
    By fostering a digitally literate and educated populace, the digitalization of secondary education can contribute to Nigeria's broader national development objectives, including economic growth, poverty reduction, and social inclusion.

Conclusion

Digitalization has changed our educational system with moderation on the conventional method of teaching. Digital education has many benefits which is seen in time saving and without paper wastage as witness in the conventional method. The comfort of location for both the instructor and the learning are quit profiting especial in this time of insecurity in the country. The Government should therefore live to its responsibility by implementing the guide line on ICT policy for the purpose of national development.

Suggestions

Policy suggestions below offer a roadmap to building a digitally inclusive and future -ready secondary education system in Nigeria

1. Strengthen Digital Infrastructure in Schools.

Governments at all levels should prioritize investments in ICT infrastructure, especially in public and rural schools, to ensure reliable access to digital tools and internet services (Akinyemi et al., 2022). The lack of power supply remains a serious obstacle; hence, solar-powered and alternative energy solutions should be adopted to mitigate electricity problems

2. Improve Internet Access and Affordability
The Ministry of Communication and Digital Economy, in collaboration with internet service providers, should expand broadband access and subsidize internet costs for educational purposes. Poor connectivity has worsened digital inequality in many Nigerian schools. Programs like Nigeria's National Broadband Plan aim to increase internet penetration and bridge the digital divide. Policy interventions should prioritize digital equity as a foundational component of educational reform (Lawson, 2024). Also, free or subsidized data bundles for teachers and students should be implemented to improve online learning engagement.

3. Build Digital Literacy Capacity among Teachers and Students
There is a need to integrate structured digital literacy training into teacher education and professional development programs (NITDA, 2023). Teachers require skills not only in using technology but also in applying digital pedagogy, the effective integration of digital tools into instruction (Moemeke, 2019).
4. Curriculum Reform for Digital Integration
The Nigerian Educational Research and Development Council (NERDC) should revise the secondary school curriculum to incorporate digital literacy, coding, and digital citizenship (NERDC, 2023). Additionally, learning content should be digitized to be interactive, accessible offline and online, and compatible with devices commonly used in Nigerian schools (EdTech Hub, 2021). The world is moving at a fast rate. The present curriculum for educational technology for teachers requires not only a review but complete overhaul to include practical use of technologies for now and for the future (Moemeke, 2019)

5. Provide and Promote the Use of Educational Digital Tools
Schools should be encouraged to adopt free or low-cost platforms such as Google Classroom, Edmodo, and WhatsApp for teaching and communication (EdTech Hub, 2021). Teachers can also leverage platforms like YouTube, PowerPoint, and Kahoot! to create engaging and contextualized content

6. Establish Technical Support Units in Schools
Each school should have at least one trained ICT support personnel to provide basic maintenance and user support for digital learning tools. This can be achieved through partnerships with NYSC ICT graduates or outsourcing to private ICT providers

7. Address Socioeconomic Barriers to Digital Access
Device loan schemes and government-subsidized programs are necessary to ensure that students from low-income households have access to digital tools (BusinessDay, 2022). NGOs and international partners should also be encouraged to support device donation and digital inclusion programs, especially in underserved areas (Wired, 2007).

8. Foster Public-Private Partnerships
Government collaboration with telecommunications firms, tech companies, and educational NGOs can provide infrastructure, devices, and training support. These partnerships should be incentivized through corporate social responsibility (CSR) initiatives targeted at schools.

9. Develop a National Digital Education Policy Framework
A robust and inclusive national policy framework should be developed to guide digital education implementation. This should include standards for access, teacher training, content development, and monitoring (NITDA, 2023). Equity and inclusiveness must remain central to all policy strategies.

10. Promote Research and Innovation in Digital Education
Government and tertiary institutions should support contextual research on best practices, adoption models, and local digital learning challenges (Akinyemi et al., 2022). Pilot projects in schools can help test and scale innovative digital learning strategies**.**

By addressing these key areas, Nigeria can make significant strides in digitalization of secondary education thereby harnessing the potential of digital education to improve learning outcomes and prepare citizens for the complex challenges in digital age .

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