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A Comparative Study of Digital Learning Adoption in Secondary Schools in Nigeria and Sweden

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ABSTRACT

This study examines how adoption of digital learning has become a major factor in shaping secondary school education globally and how Nigeria is gradually adopting this model despite peculiar challenges. Studies have shown that digital education can expand high-quality learning, improve teachers competence and enhance student learning outcomes through interactive tools. However, socioeconomic inequalities, insufficient teachers' knowledge, infrastructural deficits including inconsistent government policies have been largely responsible for the slow adoption in Nigeria. This research makes a comparison between Nigeria and Sweden, highlighting how a supportive government through the provision of strong infrastructure and policies can accelerate digital learning, offering lessons for Nigeria's context. Ultimately, bridging Nigeria's digital divide is essential to preparing students for future opportunities in a global, technology-driven economy. The study came to the conclusion that among Nigeria's most urgent problems is a consistent internet infrastructure, together with antiquated computers and other technological gear that reduces the possibilities of digital learning. The research findings shows that the government and the private sector must create the right policies and make funds available to rightly equip the teachers for the task ahead including providing an adequately equipped digital learning infrastructure in the schools at various learning levels.

Keywords: Digital education, Teachers, Secondary schools, Nigeria, Sweden, Education

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CHAPTER 1: INTRODUCTION

Background of the Study

It is evident from recent studies that Nigerian secondary schools are interested in digital learning due to the worldwide trend towards digital platforms and the increased need for technology-based education (Guobadia and Ekuobase, 2024). Despite its education revolution potential, implementing the idea in Nigeria would have pros and cons. Online education is a key tool for closing the performance gap as the nation raises educational standards and expands access to high-quality programs. Due to differences in infrastructure, legal frameworks, teacher training, and socioeconomic conditions, the benefits of this transition vary widely (Guobadia and Ekuobase, 2024). In addition, Nigeria is quickly adopting digital learning as more people realise its educational benefits. Students can use e-books, instructional videos, interactive quizzes, and virtual simulations on digital platforms to better comprehend complicated concepts (Mattsson and Pastorek Gripson, 2023). Online education may be a blessing for students who need to improve their English, maths and science abilities in areas with a shortage of competent teachers. Online learning tools let students move at their own pace, review content, and customise their learning experience. This versatility greatly enhances educational results and accommodates varied learning styles (Olanrewaju et al., 2021).

Digital learning has numerous benefits, but infrastructural hurdles prevent its use in Nigerian secondary schools. Many schools, especially in isolated areas, lack computers, dependable internet, and power. Low bandwidth and frequent power outages might hinder digital learning, especially in places with better infrastructure (Žmuk, Qureshi and Khawaja, 2023). The digital barrier between rural and urban schools worsens education inequality and hinders technology-based solutions. Digital learning is hindered by the cost of buying and maintaining digital equipment for many families and institutions (Akpan et al., 2024). In hindsight, the people that have digital education have a clear advantage in the advanced stages and are able to adapt more easily.

Another major obstacle to digital learning is educator readiness and professional development. Unfortunately, many Nigerian secondary school instructors lack the skills to integrate digital resources into their teaching (Ojetunde and Ramnarain, 2023). Without proper training and support, instructors may be hesitant to use digital gadgets in the classroom. Teachers' technical incompetence hurts students' digital learning and participation. Programs

that assist teachers utilise technology better should emphasise professional development, accreditation, and ongoing learning (Egielewa et al., 2022).

Nigeria's digital learning environment is also affected by government policies and assistance. There are several government-led projects in Nigeria to improve classroom technology. These initiatives have financial and consistency issues. Disjointed actions and low results result from a lack of plan and responsibility (Mattsson and Pastorek Gripson, 2023). Digital learning approach adoption requires efficient tracking, evaluation, and implementation. Policies must also be well-planned. Collaboration between federal, state, and local governments, corporations, and NGOs may improve digital learning initiatives by sharing resources and knowledge (Olanrewaju and Afolabi, 2022).

Digital learning adoption is strongly correlated with student and family socioeconomic position, legislation, and infrastructure. Nigeria's students are mostly poor, making it hard for them to buy basic Internet access (Guobadia and Ekuobase, 2024). Digital isolation makes it tougher for pupils to access digital resources and study online outside of school. Many pupils lacked computer access when schools were shuttered due to COVID-19. Community digital learning facilities, subsidised devices and data plans, and other targeted initiatives are needed to address these social and economic issues (Segun and Ramnarain, 2023). Public opinion influences secondary school online education acceptance in Nigeria. Some doubt the efficacy of online education compared to classroom instruction. Some educators and parents may be wary about digital learning due to screen time, distractions, and online material reliability (Ojetunde and Ramnarain, 2023). Many regard online learning as a short-term solution rather than an investment in kids' future, when it is the exact opposite as it has been seen that those people that have digital education find it easier to find better opportunities in the future in terms of knowledge and employment (Egielewa et al., 2022). To overcome cultural barriers, digital learning must be promoted by sharing success stories, highlighting its benefits, and showing how it improves student engagement and performance (Mattsson and Pastorek Gripson, 2023).

Despite these obstacles, Nigeria offers numerous remarkable digital learning projects that might inspire the globe. uLesson, Tuteria, and PrepClass have created cutting-edge solutions that meet Nigerian curriculum standards and provide engaging, culturally relevant information. Even in locations with poor internet connectivity, these platforms are for students. They function offline and utilise mobile-friendly formats. In addition, public-private partnerships have built smart classrooms and ICT centres in several schools, giving pupils

hands-on exposure with technology. These initiatives show how cooperation, personalisation, and fresh ideas accelerate online education acceptance (Han, Williams and Cui, 2021).

Future success in Nigerian online secondary education requires coordination in various areas to provide all students an advantage in terms of schooling and better education. These include community participation, legislation, staff development, and funding. Digital infrastructure funding should prioritise universal school energy, internet, and device access (Mattsson and Pastorek Gripson, 2023). Institutionalise comprehensive teacher training programs to encourage innovative education and digital skills. Effective policy implementation requires defined strategies, proper financing, and transparent assessment techniques. There is a need to provide digital education to all students, especially low-income ones, to close the digital gap (Adeyeye et al., 2022).

Digital learning promotion must include stakeholders and the public. Meeting local demands requires parental, pedagogical, administrative, and community leadership in digital learning initiative development and execution. Seminars, feedback systems, and awareness campaigns can increase stakeholder engagement and digital learning efficacy. If schools want tech-savvy, digital economy-ready students, they should encourage innovation and constant learning (Ogunji et al., 2022).

Digital learning is possible in secondary schools worldwide, although the speed, problems, and outcomes differ by country. Sweden and Nigeria both benefit from digital learning, but their techniques, infrastructure, socioeconomic situations, and educational beliefs affect its implementation (Žmuk, Qureshi and Khawaja, 2023). Rich nations like Sweden have long embraced digital technology in their classrooms, while poor nations like Nigeria confront several structural and economic constraints that prohibit digital learning. The distinct experiences of both nations demonstrate the necessity for context-specific digital learning methodologies, contributing to the global discourse (Ojetunde and Ramnarain, 2023).

Introducing online courses into Nigerian secondary schools aims to increase high-quality education, especially in low-income communities. Schools across face resource inequity, teacher shortages, and overcrowding. One reason may be the rise of student-driven, multimedia-rich internet services (Žmuk, Qureshi and Khawaja, 2023). However, infrastructural issues including inconsistent energy, slow internet, and a lack of digital devices

might limit deployment. Many rural and low-income urban schools lack the resources for digital learning. Due to a digital divide, digital resources are not reaching the most vulnerable children, worsening educational disparities (Nuhu, 2021).

The Swedish educational system has strong digital integration due to its innovative teaching aims and well-developed infrastructure. Most Swedish secondary school pupils have private electronic gadgets through school initiatives or their own resources. The government extensively funds a digital learning environment that encourages critical thinking, cooperation, and individualisation. Swedish teachers are ready to incorporate digital technologies into their classes, and pupils learn to use technology as a learning tool and skill. The Swedish curriculum emphasises digital competence, which prepares pupils for life in the digital age. Modern Sweden considers internet education essential, not a bonus (Saal, Mdlulwa and Hannan, 2025).

The circumstances and challenges of the two nations vary, but instructors must be equipped for digital learning. Many Nigerian secondary school instructors lack IT training and competence to integrate digital technologies into their lectures. Instructors may not always get the training they need (Nyamekye et al., 2022). Teachers avoid digital learning technologies due to a lack of professional development, and insufficient support and resources restrict their usefulness. Swedish citizens value professional growth. Schools use training, support networks, and digital resources to keep teachers up to date on technology. This cash will help Swedish teachers to test new methods and use technology effectively (Essadi, 2021).

National strategy and government policies also matter. The National Policy on Information and Communication Technology in Education and the Digital Nigeria Programme promote ICT integration in Nigerian schools. These attempts show a rising acknowledgement of digital learning, but bureaucratic red tape, limited money, and poor coordination limit their success (Panteri et al., 2021a). Pilot projects typically fail due to ambitious policy frameworks and poor execution. In contrast, Sweden's well-structured policy framework integrates digital education into national development goals (Guobadia and Ekuobase, 2024). The Swedish government's strategic leadership, clear standards, and significant financial channels have made digital learning efficient at all educational levels. Along with proper funding, national digital strategies are carefully evaluated and changed depending on research and feedback. This enables for future enhancement and expansion (Panteri et al., 2021b).

Socioeconomic issues strongly influence digital learning. Online education is unavailable to many Nigerian students due to cost. These differences were highlighted during the COVID-19 epidemic when digital isolation prevented many students from participating in remote learning (Mattsson and Pastorek Gripson, 2023). Some private sector and NGO solutions were temporary and not comprehensive or sustainable. Swedish students benefit from the country's high level of living and practically ubiquitous internet connection, which enable remote and hybrid study. Sweden's shift to online education was easy despite the pandemic because of its well-established infrastructure and students' and instructors' digital literacy. This kept learning going, proving the resilience of a digital learning environment (Razak et al., 2023).

Technology's use in education is another cultural difference between the two countries. Nigerian parents and teachers may be wary of using technology in the classroom owing to the country's traditional values. This opposition stems from data price concerns, popular distrust of technology, and excessive screen time. Some also think online classes lack structure and personalised attention (Žmuk, Qureshi and Khawaja, 2023). Swedish people see online education as a natural evolution from the country's long history of innovation and lifelong education. In most classrooms, students and teachers are comfortable utilising digital tools, which promote face-to-face engagement. Cultural tolerance allows new digital learning methods to be accepted and tested, creating a more responsive and flexible learning environment (Ajonbadi, Olawoyin and Adekoya, 2023).

Digital learning has limitations, even in developed countries like Sweden. Media balance, screen addiction, and digital fatigue are persistent challenges. Tech-dependent kids may lose key academic abilities and face-to-face social relationships, say experts (Maketo et al., 2023). One of the major examples is that in Sweden in many schools digital learning is taught to children in schools even from the years 10 and above (Mattsson and Pastorek Gripson, 2023). Children that get digital education at the age of 10 years are quicker to adapt to digital learning more quickly and so age plays a vital role in this aspect. Digital education addresses these issues through digital balance, critical thinking, and human-centered design (Panteri et al., 2021b). Despite Nigeria's fundamental problems, the will to solve them is strong. Solar-powered virtual classrooms, smartphone applications suited to local curriculum, and tech collaborations to improve digital resource access are being explored by stakeholders. Despite their youth, these projects aim to improve education using technology (Olanrewaju and Afolabi, 2022).

In conclusion, online education is still evolving, but it has immense potential to change secondary education in Nigeria. The community, companies, government, and businesses must work together to tackle socioeconomic, infrastructural, and educational issues. Nigeria can improve education for all students by upgrading its digital infrastructure, empowering teachers, and boosting technology availability. With preparation, creativity, and cooperation, we can overcome the numerous hurdles of digital learning and better prepare children nationwide for a tech-driven future (Segun and Ramnarain, 2023).

Sweden and Nigeria are at various stages of digital learning for cultural, social, and economic reasons. Targeted investment, grassroots innovation, and participatory policy-making are crucial, as seen in Nigeria and Sweden (Panteri et al., 2021b). Nigerian secondary schools need infrastructure, teacher training, community participation, policy consistency, and strategic partnerships to fully integrate digital learning (Han, Williams and Cui, 2021). Since more learning is happening online, Sweden and Nigeria might learn from one other to establish more accessible, efficient, and robust educational institutions. Let's close the digital gap and create an inclusive future where every child, regardless of background or family income, can receive an excellent education enhanced by technology through information sharing and creative problem-solving (Mattsson and Pastorek Gripson, 2023).

Research Aims

This study compares and contrasts digital learning technologies in secondary schools in Sweden and Nigeria to better understand their success or failure. This study examines government policies, infrastructure, and teacher readiness to improve digital learning in Nigeria. The findings will add to digital education discussions and may influence policy decisions on inclusive, technology-driven learning environments.

Research Objectives

- Nigerian and Swedish secondary schools' digital learning advancement is of great importance to us.
- Compare and contrast the main elements affecting online education adoption in the two nations.
- This investigates how modern-day technical enhancements and policy-driven solutions may enhance Nigerian on-line learning.

Research Questions

- How typical are on-line training assets in secondary faculties in Nigeria and Sweden?
- What obstacles prohibit Nigeria from adopting digital learning compared to Sweden?
- Can Nigerian politicians and IT developers collaborate to boost online education?

Rationale of the Study

Digital learning in Swedish and Nigerian secondary schools must be examined to understand how legal, technical, and socioeconomic settings affect educational innovation. After the COVID-19 outbreak, online education demand has skyrocketed worldwide (Guobadia and Ekuobase, 2024). Comparing two nations at various levels of development can illuminate the pros and cons of classroom technology. Infrastructure and digital literacy issues are preventing digital learning from revolutionising Nigeria's education system. Sweden, with its well-developed infrastructure and laws that have blended its population, may be an example. The study analyses the two environments to provide flexible options for digital learning implementation, especially in low-resource locations. This study contributes to worldwide discussions on educational fairness, innovation, and technology in future classrooms (Akpan et al., 2024).

CHAPTER 2 LITERATURE REVIEW

2.1 The Importance of Digital Learning in Nigeria and Sweden

According to Akpan *et al.* (2024), Comparing Sweden and Nigeria's educational systems shows how digital learning has revolutionised education globally. Even if their financial and technical origins differ, both nations use digital learning tools to improve education. Digital learning may remove educational barriers, encourage lifelong learning, and reduce social, economic, and geographical success gaps in both contexts.

Angwaomaodoko (2023) argues that online learning might solve Nigeria's educational challenges. Rural and destitute Nigerian students have struggled to get an education due to a lack of classroom space, trained teachers, and literature. These issues have hampered pupils' academic success and equal education. With online education, many of these concerns have been solved. E-learning platforms, mobile education apps, and online courses allow Nigerian students to access high-quality course materials and other learning aids from anywhere. Knowledge democratisation is vital, especially in sparsely populated areas with few or no regular schools (Olanrewaju *et al.*, 2021).

According to Nwoke, Uitto and Lavonen (2022), Nigeria also has a growing youth population interested in and competent in digital technologies. Mobile phone use and internet availability have grown unevenly, creating new opportunities to integrate digital technology into education. Online education has grown due to government programs and public-private collaborations. The Nigerian National Broadband Plan and other projects by UBEC and the NCC aim to improve connection and provide digital learning tools to students and instructors. These measures are helping Nigeria adopt digital education, but infrastructure, energy, and data costs remain (Nannim and Yushau, 2024).

Sweden's education system uses technology to improve learning more than other countries. The country fosters educational innovation through widespread internet access and a strong digital infrastructure. Digital learning in Sweden is part of a pedagogical model emphasising student-centred learning, creativity, and critical thinking. Swedish schools have invested in digital resources for personalised learning, collaboration, and formative evaluation. Digital platforms allow kids to create, collaborate, and solve problems (Lai and Fong, 2024).

Digital competence is a priority in Sweden's education agenda. Teachers undergo ongoing professional development to stay current with technology and teach digital literacy

from an early age. The Swedish National Agency for Education advises schools on digital learning integration. Swedish universities have also increased education quality and made it more accessible to overseas and returning students using digital resources (Oyelere and Aruleba, 2025).

Online education is essential for training students for jobs in the modern economy, independent of Sweden's or Nigeria's technological status. Online learning allows Nigerian students to develop the skills they need to succeed in the global economy despite the educational system's flaws. Online education is claimed to improve education, stimulate classroom innovation, and provide the groundwork for lifelong learning in Sweden. Both nations invest in digital resources through different means and to different degrees (Razak *et al.*, 2023).

Online courses have helped Sweden and Nigeria close the accomplishment gap. Many poor Nigerians, especially conflict zone girls and children, struggle to learn. Digital learning, which is not tied to school schedules or classrooms, gives pupils greater flexibility to tackle these problems. E-learning systems offer engaging information for all students, including those with cognitive or physical limitations. Assistive technologies and digital learning plans have helped Sweden make education more accessible (Balcioglu, Sezen and İşler, 2024).

Importantly, digital learning may help instructors improve professionally. Nigerian schools lack skilled teachers and training opportunities, which hurts student performance. Digital learning platforms enable educators to participate in online courses, webinars, and communities of practice, advancing their careers (Ochnio *et al.*, 2024). Teachers may improve their digital literacy, remain current on pedagogical trends, and use more effective teaching tactics. Online technologies for formative evaluation, classroom administration, and customised lesson planning are available to Swedish educators. State, federal, and local school administrations fund ongoing professional development for teachers to succeed in digital classrooms (Ojetunde and Ramnarain, 2023).

Digital learning also promotes lifelong learning, which is becoming more important in today's fast-paced environment. Nigerians of all ages benefit from MOOCs, skill development platforms, and virtual academies that teach valuable skills (Woodward *et al.*, 2023). The high young unemployment rate and rapid economic development make this a priority. Through online education, Nigerians may reskill and improve in data science, digital

marketing, entrepreneurship, and computer programming. Sweden has long-standing legislation and incentives for enterprises to foster career-long learning. Digital learning is essential to developing one's profession, taking on more responsibility, and maintaining one's place in today's knowledge-based economy (Han, Williams and Cui, 2021).

Despite its benefits, both nations struggle to maximise online education. Poor infrastructure, social inequality, and policy shortcomings have slowed Nigeria's growth. Low-income and rural areas still struggle with internet and digital device access. Digital education initiatives should be part of a national education reform agenda. The main issue in Sweden is that youngsters skilled at using digital resources should not be shut out of learning. Other concerns include screen usage, data privacy, and a balanced digital-traditional teaching approach (Žmuk, Qureshi and Khawaja, 2023).

In conclusion, digital learning in Sweden and Nigeria can improve education, promote fairness, improve educator professional development, and inspire students to study throughout their lives. Despite huge variances, both nations utilise digital technology in the classroom to prepare their citizens for the digital age. Online education improves education and creativity in Sweden but may also improve equity and access in Nigeria. Both nations need continued investment, legislative backing, and international collaboration to profit from digital learning and overcome its obstacles (Almaki *et al.*, 2025).

2.2 Technological Advancements in Nigerian and Swedish Secondary Schools

2.2.1 Integration and Accessibility of Educational Technologies in Nigerian Secondary Schools

Electronic learning aids in secondary schools are a priority in Nigeria's ongoing educational reform. Due to several issues, Nigeria's large and young population struggles to receive a high-quality education. Outdated texts, large classes, limited classroom space, and unqualified teachers contribute. Educational technology helps reduce structural barriers and promote inclusive education, which is crucial. These technologies have immense potential, but political, social, and infrastructure concerns have caused unequal incorporation into Nigerian secondary schools (Van De Werfhorst, Kessenich and Geven, 2022).

Over the past decade, more Nigerians have realised the potential of technology in the classroom. With the rise of smartphones and improved internet access, digital learning technologies may be integrated into classroom training. Several initiatives have given schools

iPads, projectors, interactive whiteboards, and laptops. Both public and private entities are included. Multimedia materials, online quizzes and classrooms, and tailored learning aids may improve education properly. Many poor and rural communities lack the infrastructure—like reliable energy and internet—to integrate these technologies (Olugbade, Oyelere and Agbo, 2024).

The National Policy on Information and Communication Technology (ICT) in Education is one of several Nigerian government attempts to improve educational technology. This policy framework outlines ways to improve infrastructure, remodel curriculum, and prepare teachers to use technology across grade levels (Aderibigbe and Gumbo, 2024). Universal Basic Education Commission (UBEC) and National Information Technology Development Agency money have helped public schools install ICT equipment. Many jurisdictions offer digital literacy programs to teach instructors and students how to utilise digital resources in the classroom. These initiatives show that digital literacy is becoming more important in educating pupils for the global information economy (Akpan *et al.*, 2024).

These advances aside, Nigerian secondary schools lack instructional technology. Metropolitan schools, especially wealthy ones, have the staff and resources to integrate digital learning. However, significant budget cuts mean rural public schools cannot always afford enough technology. Due to the digital divide, tech is widening educational inequality. Many schools without technical assistance and maintenance services cannot keep their technological equipment running. Donated or government-issued ICT gear may become unused or outdated due to neglect or poor education (Angwaomaodoko, 2023).

Instructors' expertise hinders technology utilisation in the classroom. Nigerian secondary school instructors may lack the skills to use technology efficiently. Even when readily available, instructors may be sluggish in adopting digital technology due to a lack of knowledge or preference for older approaches. Teachers need ongoing professional development and in-service training to be tech-savvy. Programs emphasising real-world applications, pedagogical integration, and collaborative learning can help instructors leverage digital resources to improve lesson delivery, student engagement, and learning results (Olanrewaju *et al.*, 2021).

Socioeconomic factors also affect students' access to instructional technology. Due to a paucity of home computers and other digital devices, many Nigerian students struggle with online or hybrid programs. During the COVID-19 epidemic, students had to learn via

radio or the internet because schools were closed. Some urban students could keep up with their homework using online resources, but many, mainly rural students, lacked computers, phones, and energy. This tragedy underscored the vital need to provide online education to all students, regardless of income or geography (Nwoke, Uitto and Lavonen, 2022).

A comprehensive plan is needed to improve Nigerian secondary schools' technology availability and utilisation. It should be a priority to supply every school with electricity, internet, and enough tech. By pooling resources and experience, private-sector, government, and international development partnerships may boost these initiatives (Nannim and Yushau, 2024). Policies should emphasise long-term sustainability and local context to provide inexpensive, adaptive technology to communities and schools. Any classroom technology approach should start with teacher training. Comprehensive professional development programs may help instructors incorporate technology into their lessons. These programs should provide teachers with one-time and continuing training and support to use new technologies and best practices (Lai and Fong, 2024).

Involving students in educational technology development and use may boost engagement and ensure digital resources are tailored to their learning styles. Student-centred techniques that stimulate creativity, cooperation, and analysis can maximise classroom technology utilisation. Schools may teach kids about cyber safety, digital citizenship, and media literacy to encourage ethical technology usage. Now more than ever, children need help utilising the internet securely and successfully due to the abundance of information (Oyelere and Aruleba, 2025).

After tremendous work, Nigerian secondary schools now have computerised teaching tools, but it will be some time before every student can benefit. Technology may revolutionise education in Nigeria, but it needs persistent investment, inclusive policymaking, and a commitment to solving structural issues. Through educational technology, Nigeria may improve learning, promote fairness, and prepare pupils for the 21st-century global economy. This may be done by encouraging technology use, giving instructors greater power, and reducing the digital achievement gap (Razak *et al.*, 2023).

2.2.2 Digital Innovation and Pedagogical Transformation in Swedish Secondary Schools

The Swedish government's ambition to integrate technology in secondary schools reflects its long history of educational innovation and technological leadership. Swedish schools prioritise digital technology for diversity, equity, and learner-centred education, unlike

nations that regard it as optional (Balcioglu, Sezen, and İşler, 2024). The country's use of digital tools stems from a belief that education drives social progress and economic competitiveness. Sweden's commitment to equality, technology innovation, and school trust prompted this development. Sweden's long-standing welfare model, tolerance for technical innovation, and excellent digital infrastructure made it one of the first countries to embrace digital technology in the classroom. The government saw early on that digitisation may improve individualised learning and inclusion. Pilot initiatives in the 1990s promoted digital learning by encouraging teachers to utilise computers in classrooms and receive ICT training. This early start let secondary schools embrace technology easily.

The 2017 national school digital strategy marked a turning point. Teaching kids to succeed in the digital age was its main goal. The method assumes that children learn best when provided real opportunity to use digital technologies meaningfully (Han, Williams and Cui, 2021). The paradigm encourages innovation, problem-solving, information literacy, and ethics. Ojetunde and Ramnarain (2023) state that the goal is to boost student participation and involvement through smart digital technology utilisation to improve education. Learning management systems, interactive whiteboards, and high-speed internet are used in Swedish secondary schools. These technologies simplify student and instructor engagement, content delivery, progress evaluation, and communication. The one-to-one device policy currently gives every student and instructor a tablet or laptop. According to Woodward et al. (2023), digital platforms allow students to study at their own speed, access resources as needed, and receive immediate feedback.

According to Žmuk, Qureshi, and Khawaja (2023), digital pedagogy-trained instructors utilise Google Classroom and Microsoft Teams for scheduling, discussion, task assignment, and student progress monitoring. Swedish education's early and purposeful use of digital technologies shows how technology may improve classroom equity, creativity, and quality. Digital technology has helped Swedish pedagogy shift from teachers to students. Students usually sit quietly and absorb the content in traditional classes where the teacher has all the authority. However, contemporary Swedish professors help students and encourage them to take more responsibility for their education (Olugbade, Oyelere and Agbo, 2024). Digital resources allow students to do inquiry-based learning, collaborative projects, critical thinking, communication, and creativity. Students use internet research, digital information, virtual games and simulations, and multimedia technology to make learning more engaging.

These strategies improve kids' academic performance, digital skills, and real-world readiness (Almaki *et al.*, 2025).

Swedish secondary school digital innovation offers teachers professional development and independence. As renowned specialists, Swedish educators are encouraged to try new teaching approaches and equipment, creating a culture of innovation. Continuous professional development is essential for educators to adapt to digital changes (Aderibigbe and Gumbo, 2024). This includes seminars, peer learning, and online courses. Additionally, school administrators should give teachers the tools, time, and space to trial innovative techniques to assist digital transformation. This student-centred and empowered digital pedagogy adapts to new technology and student requirements (Van De Werfhorst, Kessenich and Geven, 2022).

Sweden's online education approach emphasises justice and diversity. Technology can assist all students, even those with linguistic or socioeconomic difficulties, since it levels the playing field. Multilingual digital content, customised learning platforms, and assistive technology are needed to give all students an excellent education that suits their requirements. Sweden's inclusive digital learning environment reflects its values of social justice and equal opportunity. Due to its extensive computer network and experienced teachers, Swedish schools smoothly shifted to online instruction during the COVID-19 epidemic (Martin *et al.*, 2024).

These benefits aside, Sweden's secondary schools' digital transition has drawbacks. If instructors and administrators overuse technology, kids may miss important concepts and the significance of face-to-face engagement. Educators must blend digital and traditional pedagogies to avoid replacing critical thinking and human connection with technology (Segun and Ramnarain, 2023). Moreover, with all the debate about how screen time impacts students' health and welfare, schools have rules and procedures to promote appropriate and healthy device use. Data privacy and cybersecurity are big problems. Thus, schools must teach pupils online safety (Adanma and Ogunbiyi, 2024).

New technologies are changing evaluation methodologies. Digital assessments, e-portfolios, and project-based evaluations improve traditional testing to show students' progress. These alternate evaluation approaches provide more precise progress monitoring, faster feedback, and formative assessment procedures that impact training (Lucas *et al.*, 2025). Differentiated assessment is easier to execute because digital technology can personalise

assignments based on student's skills and learning objectives. The Swedish educational philosophy emphasises student growth above generic assessments, which supports this method (Panteri *et al.*, 2021).

Data analytics, AR/VR, and AI will increasingly influence secondary school digital learning in Sweden. These improvements enable more customised lectures, fully immersive classrooms, student progress and knowledge acquisition data. Their widespread acceptance will depend on infrastructural expenditures, teacher professional development, and ethical frameworks that ensure equitable, inclusive, and educationally sound technology use (Edwards-Fapohunda, 2024).

Finally, Sweden's secondary schools demonstrate a deliberate educational reform strategy using new technologies and instructional methods. Technology integration transforms teaching and learning beyond supplying gadgets and the internet. Sweden has established a digital learning environment that can handle current difficulties because of its progressive legislation, strong infrastructure, skilled instructors, and justice. Despite current obstacles, Sweden's experience shows how technology may improve inclusive, future-focused education (Dhali, Hassan and Subramaniam, 2023).

2.3 Policy Frameworks Supporting Online Education in Nigeria and Sweden

2.3.1 Policy Frameworks Supporting Online Education in Nigeria

Online education has grown as an alternative to the Nigerian education system, with congestion, limited facilities, and a burden of geographical constraints. Nigerian educational institutions and the government must develop online learning policies to keep up with the global digital change. These frameworks aim to give all students a high-quality education regardless of family income or region. As a result, the government has created various laws and adopted several techniques to emphasise the relevance of ICT in education, particularly e-learning, digital literacy, and distance learning (Tom-Lawyer, Thomas and Kalane, 2021).

The Federal Ministry of Education's National Policy on Information and Communication Technology in Education was one of Nigeria's earliest and most important online learning laws. This strategy emphasises using ICT to improve education at all levels. It recommends research, curriculum creation, infrastructure building, and teacher training for optimal ICT use (Maketo *et al.*, 2023). The policy governs classroom ICT use, digital content creation, and remote learning. It emphasises global public-private collaborations for

information and finance. Nigeria's long-term aims to close the digital gap and create a viable online education paradigm require this cooperation (Nyamekye *et al.*, 2022).

The National Digital Economy Policy and Strategy of the Federal Ministry of Communications and Digital Economy is another major framework. Education underpins this goal to make Nigeria a global digital economy. This government effort aims to improve digital literacy, especially among educators and pupils (Yoon *et al.*, 2025). Digital research centres, online learning platforms, and "smart campuses" using cloud computing, AI, and mobile learning are also encouraged under the concept. This strategy promotes digital inclusion in education, so all low-income and rural students without easy school transit may obtain a quality education (Mpofu and Sebele-Mpofu, 2024).

The Nigerian government has tried institutionalising distance learning through the National Open University of Nigeria (NOUN), a primary online education provider. NOUN provides inexpensive, accessible education to working professionals, stay-at-home parents, and remote learners. Regulations enable the university's online offerings (Ogunbodede *et al.*, 2023). These programs have online classrooms, digital learning tools, and a strong LMS. Online education might solve traditional education's capacity and accessibility difficulties with NOUN's success. Many schools have implemented blended learning after the COVID-19 outbreak, inspired by this idea (Biamba *et al.*, 2021).

The Nigeria Education Sector COVID-19 Response Strategy used digital platforms, broadcast media, and mobile apps to keep learning going during the pandemic. The federal education ministry did this. This emergency reaction showed the necessity for a more structured and long-term remote learning infrastructure. Many schools have accelerated digital transition by employing LMSs like Moodle, Google Classroom, and Microsoft Teams. The government and telecom companies subsidised data charges to give more schools and youngsters internet access. These efforts demonstrate the growing consensus that online education is vital to our education system and requires legislative support (Anyasi and Foss, 2021).

The Universal Basic Education Commission (UBEC) e-learning project has also promoted the importance of technology in basic and secondary school curricula. This effort provides digital learning tools, ICT hubs, and teacher training to improve digital pedagogy (Arobo, 2022). Despite financing and infrastructure differences, governments have adopted unevenly. However, the policy structure facilitates access to state-wide online courses. If

UBEC's plan to integrate ICT into the core curriculum is realised, pupils will be better prepared for a future where technology is vital to their careers and personal lives (Khusanov, Khusanova and Khusanova, 2022).

Two regulatory organisations—the National Universities Commission (NUC) and the National Board for Technical Education (NBTE)—have set standards to improve university-level online and distance education to augment government initiatives. Electronic assessment, virtual labs, and online course delivery are part of the NUC's new Benchmark Minimum Academic Standards (BMAS) (Ekemiri *et al.*, 2022). University directorates of remote learning are recommended by the commission to manage online degree programs. Given the significance of technology in broadening access to skill-based education, the National Board for Technical Education (NBTE) supports blended learning methodologies in technical and vocational schools. Online education is protected by setting delivery, grading, and assessment standards (Igbatayo, 2023).

Nigeria faces difficulty implementing online education policy frameworks. Digital divides—internet access, device ownership, and power sources—are significant obstacles. Rural and low-income populations may not be able to benefit from online education completely. Many teachers need continual professional development to improve their digital literacy and integrate technology into their lessons. If we want to overcome these problems, public, private, and civil society entities must collaborate to promote online education (Barak and Avcı, 2022).

Financial constraints for infrastructure, training, and content creation sometimes limit the widespread adoption of clear rules and goals. Education, especially digital change, needs more significant funding. We may consider public-private partnerships and foreign donor funding to deploy resources further. To minimise duplication and meet national development goals, stakeholders must collaborate and preserve policy consistency for online education projects (Yusuf *et al.*, 2024). Monitoring and evaluation are also needed to assess online education policy and make informed improvements. Using current measurements and performance indicators might increase digital skill acquisition, enrolment, retention, and learning outcomes. Based on these findings, governments, capacity-building groups, and funders may make online education more adaptable for students and instructors (Awais, 2023).

The mechanisms that promote online education show that Nigeria's government is beginning to grasp its revolutionary potential. With its ICT goals and distance education

legislation, the government has set the stage for a contemporary, inclusive, and robust education system. These policies can only succeed with continued effort, proper financing, and careful execution. Online education may boost Nigeria's prosperity by improving its infrastructure, digital literacy, and cooperation. Nigerian children and youth need government assistance to keep education a right rather than a privilege in the digital era (Tom-Lawyer, Thomas and Kalane, 2021).

2.3.2 Policy Frameworks Supporting Online Education in Sweden

Sweden is becoming a global leader in digital innovation, especially in online education. The high internet penetration, solid digital infrastructure, and national culture that emphasises technical innovation and educational accessibility made Sweden an early user of digital learning. Since 1999, when ITiS (IT in Schools) launched, the Swedish government has been studying ways to incorporate ICT into the classroom (Biamba *et al.*, 2021). This effort sought to achieve its aims by encouraging teachers to utilise ICT in their normal classrooms and providing digital pedagogy training. Before the COVID-19 epidemic, the Swedish education system was skilled in mixed and online learning settings due to the government's early investments in broadband access and digital literacy. Sweden's decentralised education approach also allows schools and towns to adopt innovative online teaching methods, making the educational system more flexible and accepting (Panteri *et al.*, 2021).

Sweden's 2017 National Digitalisation Strategy for the School System supports online learning. With this policy's aims, all students will learn digital skills and technology will be properly incorporated into classroom instruction and school administration. It stressed the need of educator training, technological equity, and digital learning tools. The strategy required schools to teach digital competency and prepare pupils for the digital age (Panteri *et al.*, 2021). Since the government encouraged digital platforms and OERs, more people may benefit from online education. Sweden was ready when the COVID-19 epidemic compelled schools to switch to online learning due to its strong legal system. Sweden's higher education institutions switched to online study fast during the epidemic, unlike many others. Years of policy-driven digital preparedness, instructors' online expertise, and students' personal digital gadgets helped them move smoothly (Khusanov, Khusanova and Khusanova, 2022).

Sweden's online education trend intensified due to COVID-19. The rapid change in pedagogical paradigms revealed the merits and downsides of Swedish education. Online

learning's technological components were handled well by teachers and students using SchoolSoft, Google Classroom, and Microsoft Teams. Lack of involvement revealed basic disparities that no amount of technology can remedy for low-income students (Panteri *et al.*, 2021). In order to close the digital accomplishment gap, the Swedish government increased school financing and internet access. Data privacy, screen time, and online education efficacy have raised concerns. Sweden regularly evaluates its rules to assess the epidemic's digital learning initiatives and guide future choices on online and hybrid education as part of its long-term education reform (Biamba *et al.*, 2021).

Sweden is widely cited by the OECD and other international education bodies for its comparative statistics on educational trends. Many OECD studies have praised Swedish schools' innovative technologies and progressive legal frameworks. Swedish policy meets OECD objectives for digital fairness, lifelong learning, and 21st-century skills in the curriculum (Van De Werfhorst, Kessenich and Geven, 2022). Sweden's involvement in the OECD's Programme for International Student Assessment (PISA) shows that digital technologies' effects on learning outcomes have affected legislation. Sweden's clarity about policy changes and digital efforts has aided worldwide post-pandemic education discussions. Swedish digital education has succeeded due to meticulous planning, robust infrastructure, and a dedication to diversity and innovation in classrooms (Panteri *et al.*, 2021).

Sweden's online education strategy is based on a progressive, comprehensive policy framework prioritising fairness, innovation, and lifelong learning. Education would adopt digital technology after healthcare, government, and transportation. Sweden's educational policy frameworks aim to help all Swedes succeed in today's technologically advanced society (Khusanov, Khusanova and Khusanova, 2022). Policymaking relies on a digital transformation approach, including physical infrastructure, professional competency, student agency, and educational development. The government has established strategic goals to integrate and sustain online education at all levels of schooling with regional authorities and educational institutions (Edwards-Fapohunda, 2024).

The Ministry of Education and Research's digital roadmap for education underpins Swedish online education rules. This approach unifies Sweden's education sector's digitisation. Its three key goals are digital competency for instructors and students, digital learning environment research and innovation, and fair access to digital tools and infrastructure (Nyamekye *et al.*, 2022). The policy acknowledges that digital technologies are important for transmitting information and as modern instructional components that stimulate critical,

creative, cooperative, and independent thinking. This framework encourages local governments and school administrators to include digital education in their strategic plans so all students, regardless of socioeconomic status or location, can benefit from technological advancements (Mpofu and Sebele-Mpofu, 2024).

Due to the system's significant decentralisation, Swedish schools and municipalities can customise the national curriculum. National legislation and quality standards ensure uniformity and fairness, enabling this flexibility. Swedish schools and towns depend on the Swedish National Agency for Education for digital tools, professional development, and curricular frameworks to implement the digital plan. The agency offers online educator training in digital didactics, electronic assessment, and online classroom administration. These programmes will provide teachers with the tools to create and deliver interactive online courses that promote ongoing development and innovation (Biamba *et al.*, 2021).

Sweden's strategy prioritises lifelong learning and integrating formal, non-formal, and informal paths. The government recognises that digital technology may make learning more accessible and adaptable, especially for adult learners, immigrants, and those living far away. Policies seek to encourage adult, vocational, and university online education. The Swedish Higher Education Authority and Council for Higher Education strictly regulate online course production and delivery at Swedish universities. These bodies manage quality control and accreditation to ensure online degrees are comparable to on-campus ones (Panteri *et al.*, 2021).

Sweden has invested much in e-learning research and development, like other nations. Publicly financed research initiatives commonly work with the Swedish Research Council to explore digital learning technologies, online education's effects on student results, and data ethics in education. This study's findings can guide legislation and improve online learning systems. Studying students' online engagement and performance has led to the creation of adaptive learning systems that meet their demands. The Swedish government's support for free educational materials and digital content shows its commitment to educational fairness and knowledge sharing (Van De Werfhorst, Kessenich and Geven, 2022).

The Swedish online education policy protects students' data. Digital learning environments are legal for protecting student and teacher data under the GDPR. The General Data Protection Regulation (GDPR) and Swedish educational policy support data protection, digital infrastructure enhancement, and data openness. Higher education institutions should

emphasise data protection and digital citizenship education for faculty and students. We can increase confidence in online education and support the national digital plan by emphasising appropriate digital activity (Martin *et al.*, 2024).

The COVID-19 pandemic expedited Sweden's online education regulations. While schools were closed, the Swedish government quickly increased teaching resources, student gadgets, and digital infrastructure to support remote learning. The epidemic showed Sweden's online education system's strength and the need to adjust. Despite the pandemic, the government has funded hybrid learning approaches that integrate online and in-person training because of their benefits. The problem inspired new policy guidelines and measures to make schools more technologically prepared and inclusive (Khusanov, Khusanova and Khusanova, 2022).

Sweden aims to narrow the digital divide as part of its digital inclusion policy. Sweden has high internet penetration and digital access, yet demographic differences in technology use and digital understanding persist. Low-income, disabled, and immigrant students are targeted by federal and state efforts to reduce the achievement gap. Swedish education policy promotes digital inclusion for educational fairness. Initiatives are ongoing to provide all students with subsidised internet, free online learning platforms, and specific digital skills training to fully engage in digital learning (Biamba *et al.*, 2021).

Sweden's online education plan prioritises teacher training. Since technology alone cannot solve education's problems, the government focuses on teacher training and pedagogy. Digital literacy and classroom use training is required for all national instructors (Arobo, 2022). Digital pedagogy should be standard in university and teacher preparation programs, which educates future instructors to handle online classrooms. Teachers get professional development through peer learning networks, publicly supported programs, and educational technology collaborations. These programs seek to create more confident and competent teachers who can use technology successfully to boost student performance (Tom-Lawyer, Thomas and Kalane, 2021).

Swedish higher education institutions have adopted digitalisation through strategic alliances, research collaborations, and online and hybrid learning programmes. Government initiatives fund MOOCs, digital assessment tools, and online learning (Nwoke, Uitto and Lavonen, 2022). Swedish institutions can reach students worldwide and encourage cross-cultural understanding due to internationalisation and online education rules. Digital

platforms that improve student mobility, accommodate diverse student populations, and offer different graduation tracks should be used by university administrators. These initiatives support national social cohesion, knowledge economy growth, and competitiveness (Ochnio *et al.*, 2024).

Student involvement in policymaking is another Swedish trademark. Since people consider students important to the educational community, we often ask them how to build policies and improve programs. Digital technologies enhance class personalisation, student involvement, and feedback. Regulations urge schools to incorporate students in digital learning environment design to foster ownership, motivation, and self-directed learning. This participatory method represents Sweden's democratic principles and helps education engage citizens (Dhali, Hassan and Subramaniam, 2023).

The Swedish educational system's use of digital technology is shown via its online education policy frameworks. These policies aim to build a robust, fair, and creative school system. Professional development, student empowerment, national initiatives, and local action plans are included (Woodward *et al.*, 2023). Quality assurance, data privacy, research, and inclusivity make Swedish online education accessible, effective, and sustainable. The Swedish educational system shows how to survive in the digital era via strategic planning, stakeholder participation, and constant development (Maketo *et al.*, 2023).

2.4 Key Factors Influencing the Adoption of Online Learning in Nigeria and Sweden

Economic, social, cultural, and coverage variables have an effect on line training in Sweden and Nigeria. Both international locations have made sizable development in adopting digital schooling, however their social, political, and monetary contexts have an effect on how they integrate online studying into their instructional institutions. By reading these facts, we may additionally moreover understand the important thing drivers and breaks for on-line mastering adoption and implementation in those worldwide places and their similarities and contrasts (Lucas et al., 2025).

Nigeria's infrastructure is an extensive obstacle to online training. Students in remote places with unusual electricity outages and sluggish internet connections frequently lack the virtual equipment to interact in online publications fully. Despite those problems, the Nigerian authorities have spent an exquisite deal on its digital infrastructure and promoted net admission to and digital literacy. Online gaining knowledge is restrained via way of network issues, mainly in rural places (Biamba et al., 2021). This problem is worsened because many

of the country's youngsters lack dependable digital gadgets and internet connections. These difficulties make online learning harder for low-income students and impede digital learning uptake, which increases educational inequality (Igbatayo, 2023).

Older and more established is Swedish online education. The government has emphasised school digital resource access in this nation, which has one of the highest internet penetration rates. High-speed internet, tablets, and laptops allow most Swedish schools to provide online learning (Martin *et al.*, 2024). Sweden's public and private schools provide great online learning settings, which is helping online education grow. Sweden has a more minor issue than Nigeria, especially in rural or low-income regions. Sweden's extensive initiatives to eliminate success inequities include providing more digital tools to all pupils, especially low-income ones.

Socioeconomic status affects online education in both nations. The socioeconomic gap between rural and urban Nigeria hinders online learning. Online learning is more feasible for students in urban places like Lagos and Abuja, where the internet and other digital gadgets are more accessible. Many rural households cannot afford the technology and internet connections needed for online schooling, exacerbating the access gap. The digital gap inhibits many Nigerian students from enrolling in online education (Nannim and Yushau, 2024).

Sweden's favourable socioeconomic status makes online education increasingly popular. Sweden has a well-funded educational system that invests much in digital technology. One of the world's wealthiest countries (Balcioglu, Sezen and İşler, 2024). Most Swedish households can afford online education, but the government provides subsidies and other financial help for low-income students. The Swedish government has implemented several digital inclusion efforts to ensure that students from all economic backgrounds may study online. Digital education solutions may be widely applied in Sweden due to their solid financial situation and the fact that most students have the equipment to learn online (Ojetunde and Ramnarain, 2023).

Online education has grown due to both nations' cultural views on education and technology. Sweden has historically valued innovation, technology, and education. Swedish schools have fully adopted digital learning due to its social support and potential to improve learning results. The Swedish educational system emphasises digital literacy, so students and instructors are comfortable with various digital technologies (Tom-Lawyer, Thomas and Kalane, 2021). National educational policy frameworks reflect social acceptance of

technology by emphasising classroom integration of digital tools. Swedish educators are urged to move beyond digital content instruction. Use these tools to teach pupils teamwork, creativity, and critical thinking. This cultural openness to technology has made online learning in Sweden's educational system easy (Barak and Avcı, 2022).

Despite the growing recognition of technology's role in education, many communities, especially rural ones, still oppose digital learning. Many professors utilize outdated approaches that emphasise class discussions and memorisation (Van De Werfhorst, Kessenich and Geven, 2022). Parents, students, and instructors may be cautious about online learning due to society's preference for traditional schooling. Online courses and digital learning benefits are unknown to the public, a third impediment. Despite the growing number of people seeking online degrees, especially in big cities, the cultural transformation needed to make them popular is still underway.

Government policies and educational institutions' digital education initiatives also affect online education growth. Nigeria established the National Policy on Information and Communication Technology (ICT) in Education and the National Open University of Nigeria, a pioneer in remote learning, to promote online education (Nwoke, Uitto and Lavonen, 2022). Due to little money, incompetent staff, and inconsistent policy enforcement, these standards have been impossible to meet. Even while the government recognises the value of digital learning, more comprehensive and consistent rules are needed to support online education countrywide (Biamba *et al.*, 2021).

Several times, the Swedish government has emphasised educational technology. The Swedish Ministry of Education and Research has a comprehensive digital education policy to encourage classroom technology use and help students and instructors learn digital skills (Maketo *et al.*, 2023). The government has also financed school digital platforms and technologies to provide students with high-quality online learning resources. Swedish teacher training programs emphasise classroom technology use, and universities are under pressure to follow suit. The Swedish government has promoted remote learning and free educational materials to increase online education participation (Dhali, Hassan and Subramaniam, 2023).

Online education growth depends on educators' responsibilities and technology skills. Swedish teachers are well-trained in digital technology use in the classroom, and professional development programs keep them learning. Swedish teacher preparation programs emphasise technological pedagogy to prepare future educators to use digital

resources (Ochnio *et al.*, 2024). Unfortunately, many Nigerian instructors lack the skills and resources to incorporate technology into their classes. Despite efforts to increase ICT teacher training, many Nigerian teachers lack computer literacy. Teachers' digital inexperience makes it hard to develop and deliver compelling and successful online courses, hindering online learning (Martin *et al.*, 2024).

Finally, the COVID-19 epidemic has prompted both nations to adopt online learning. Online learning emerged unexpectedly during the outbreak in Nigeria, showing the country's lack of digital education preparedness and the urgent need to invest in digital infrastructure and education. Online systems like Zoom and Google Classroom have swiftly taken hold in Nigeria, especially in urban institutions (Aderibigbe and Gumbo, 2024). However, internet connectivity and device accessibility remain significant difficulties. The epidemic increased online schooling in Sweden, but the country's excellent infrastructure and government backing made the shift simple. Sweden's schools were ready for the switch, and the government quickly created legislation to allow students to finish their degrees remotely Adanma and Ogunbiyi, 2024 (Lucas *et al.*, 2025).

Finally, technology infrastructure, socioeconomic situations, cultural attitudes, government rules, and educator responsibilities affect online learning in Sweden and Nigeria. Compared to Sweden's robust digital infrastructure, supporting legislation, and cultural acceptance of technology in education, Nigeria has uneven access to technology, cultural opposition to change, and poor teacher training (Biamba *et al.*, 2021). Despite these obstacles, both nations have succeeded in online education, and their lessons might help others. If both nations want online learning to become part of their educational systems, they must overcome the significant barriers to adoption as they learn more about digital education (Žmuk, Qureshi and Khawaja, 2023).

2.5 Comparative Analysis: Challenges and Opportunities in Online Education

Online learning has changed education and given students worldwide fascinating new options. Geographic considerations, including technology infrastructure, socioeconomic situations, political laws, and cultural viewpoints, affect online education efficacy and integration. The benefits and downsides of online education in Sweden and Nigeria show a wide range of digital learning usage (Balcioglu, Sezen and İşler, 2024). Unlike Sweden's well-developed infrastructure and rigorous regulatory frameworks, Nigeria's lack of resources, social and economic inequalities, and technology opposition hinder its adoption of online

education. This research compares online education's positives and downsides in the two nations to show how each environment affects digital learning (Segun and Ramnarain, 2023).

Due to Sweden's advanced technology, online education has grown rapidly. Sweden leads worldwide technology breakthroughs due to its vast internet use, access to cutting-edge technical resources, and digital expertise. Due to their extensive internet network, Swedish schools easily adapted to online courses during crises like the COVID-19 epidemic (Tom-Lawyer, Thomas and Kalane, 2021). Before the pandemic, several Swedish schools began offering online courses to update their teaching methods. The government's long-term commitment to digitalising education and technological integration has helped online education prosper in Sweden. Many Swedish classes employ online libraries, interactive whiteboards, and virtual classrooms. Students are used to using technology (Razak *et al.*, 2023).

Insufficient infrastructure has been Nigeria's most significant obstacle to online education. Many remote students cannot envisage an online education due to unstable energy, slow internet connections, and a lack of inexpensive technology (Van De Werfhorst, Kessenich and Geven, 2022). Rural Nigerian students have fewer educational options than urban students due to a lack of technical infrastructure and internet connectivity. Online learning in Nigeria is ineffective because many students cannot afford digital equipment, or rural regions lack internet (Aderibigbe and Gumbo, 2024).

Faced with the COVID-19 epidemic, many Nigerian schools have rushed to get online, demonstrating the importance of digital education. The country's infrastructure and technology were lacking during the emergency transition, making digital learning unfeasible. Conversely, the epidemic allowed Nigerian instructors to examine online education, prompting requests for more digital infrastructure funding and regional online learning initiatives. Nigeria and many NGOs are working to reduce the digital divide, but there is still a long way to go (Dhali, Hassan and Subramaniam, 2023).

Both nations' technology and education cultures profoundly impact online education's pros and cons. Teachers' use of technology is supported mainly in Sweden. Technology integration into Swedish schools has been easy since the system values innovation and development. Students and teachers in Sweden are educated to use digital learning resources. The curriculum includes digital literacy to help pupils learn subject-specific

information and technology. Digital education has exploded in Sweden due to its progressive laws and heavy technology usage (Nannim and Yushau, 2024).

However, Nigerians have a more diversified cultural attitude toward online schooling, with some even objecting. Many Nigerian parents, students, and instructors prefer classroom learning. Rural communities are less likely to adopt digital learning approaches due to traditional training and poor technology (Adanma and Ogunbiyi, 2024). Teachers' technological incompetence makes online education harder. Many teachers do not know how to use internet resources in the classroom, lowering online education quality. To shift Nigerians' ideas about technology in the classroom, we must overcome their cultural aversion to change and embrace digital learning (Ojetunde and Ramnarain, 2023).

Despite cultural differences, both nations have significant potential for online education. Providing equal access to technology across regions and educational levels in Sweden is a serious concern. Even while metropolitan regions have more internet resources, rural and poor communities should not be left behind (Ogunbodede *et al.*, 2023). The Swedish government's proposal to enhance access to digital materials by funding technology and online teacher training may solve this problem. Sweden is well-positioned to pioneer innovative online learning approaches, including blended learning, gamification, and AI-powered student personalisation, due to its long history of digital innovation (Nyamekye *et al.*, 2022).

Due to online education's expanding prominence and technical changes to its educational system, Nigeria has prospects. Despite cultural and infrastructure constraints, Nigeria's significant and youthful population wants digital technology. Mobile devices may minimise Nigeria's digital gap. Mobile learning may provide remote students access to traditional online education thanks to the ubiquitous availability of cell phones (Lucas *et al.*, 2025). The Nigerian government and multinational firms may use mobile technology to deliver nationwide scalable, cost-effective educational solutions for students. Universities, corporations, and governments may collaborate to create cheaper digital learning platforms and technology (Maketo *et al.*, 2023).

Nigeria may profit from the growing number of educational technology businesses that address the limitations of traditional teaching methods. These creative firms are developing solutions for Nigerian students' textbook shortages, teacher-student connections, and distance education technologies. These innovative enterprises can assist underprivileged

communities' instructors and students access more online education by cooperating with local, national, and international development agencies (Almaki *et al.*, 2025).

Ensuring teachers have all they need to use technology in the classroom is a concern in both nations. Even if their attempts to integrate technology into the classroom have been partially effective, Swedish teachers require continual professional development to stay up with the industry's rapid technical growth (Žmuk, Qureshi and Khawaja, 2023). Teachers must be proficient in both platforms and teaching methods to leverage digital assets. The lack of computer literacy among Nigerian teachers is a big concern. Schools should fund online professional development programs that prepare instructors for online learning. Swedish and Nigerian children benefit more from online education if teacher training is prioritised (Segun and Ramnarain, 2023).

In conclusion, Sweden and Nigeria must address the pros and cons of online education. The strong Swedish technology infrastructure and widespread cultural acceptance of digital technologies support online education (Segun and Ramnarain, 2023). We must persevere until all communities and kids, especially those from underprivileged backgrounds, have equal access to these resources. Nigeria's young population and rising interest in digital education provide great potential for transformation despite infrastructure, digital literacy, and cultural opposition (Ochnio *et al.*, 2024). Despite these obstacles, Nigeria may use mobile technology, support teacher training, and encourage digital literacy to offer online instruction to its pupils. As they explore online education, both nations might benefit from sharing experiences and ideas (Oyelere and Aruleba, 2025).

2.6 Enhancing Nigeria's Online Learning through Innovation and Policy Reforms

New policies and improved online learning possibilities are needed to modernise Nigeria's education system and make it equal, inclusive, and sustainable. Nigeria needs a solid and accessible online learning system since technology quickly changes education. The country's infrastructure, tech, and social issues may be addressed through innovation and legislative changes. Nigeria can develop a dynamic learning environment for pupils with the correct rules and a willingness to accept digital transformation (Dhali, Hassan and Subramaniam, 2023).

To improve online education in Nigeria, deploy cutting-edge technologies adapted to the country. Adaptive learning platforms, offline e-learning solutions, and mobile learning apps might transform urban and rural education. Nigeria has many mobile phone users,

making it possible to reach students without internet access (Razak *et al.*, 2023). Mobile learning applications can give students access to video lectures, e-books, quizzes, and interactive assignments. Adaptive learning algorithms can also boost student engagement and accomplishment by tailoring learning to each student's speed and performance, especially when instructors lack assistance (Nyamekye *et al.*, 2022).

Technology and educational policy reform are essential for online education. Nigeria's education policy lacks technology integration legislation and funds. Additionally, the policy fails to address digital learning challenges (Edwards-Fapohunda, 2024). Government policy reforms are needed to define digital education standards, support infrastructure and teacher training, and build e-learning courses. Teachers and students should be required to get digital literacy training to guarantee that all educational participants are skilled users of digital platforms. Policy changes must target marginalised groups, including low-income, disabled, and rural students (Almaki *et al.*, 2025).

Modern instructional technology is useless without reliable energy, quick internet, and simple access to digital gadgets. Digital infrastructure, especially in underprivileged areas, needs massive government and private sector support (Ogunbodede *et al.*, 2023). The strategy includes subsidising school and student digital equipment, introducing broadband internet to underdeveloped areas, and ensuring a constant power supply for online education. Government-business partnerships help mobilise resources for these endeavours. Nigeria is negotiating with telecoms, IT, and international development groups to improve educational infrastructure, develop new curricula, and provide digital resources (Panteri *et al.*, 2021).

Professional development for teachers is crucial. Every school relies on teachers, and their digital skills affect online learning programs. Many Nigerian instructors lack the confidence and skills to use technology effectively (Nannim and Yushau, 2024). The government should fund strong teacher training programs that stress digital literacy and effective virtual and mixed learning practices. A modern, updated, accessible training program should include online and in-person components. Mentorship programs and communities of practice may help educators gain insights, solve problems, and enhance their digital pedagogy (Oyelere and Aruleba, 2025).

Curriculum development is another step towards improving online education. Nigerian curriculums do not fit digital media or support student-centred, interactive online learning. Digital curriculum should include multimedia, interactive assessments, and

student-led collaboration. Students should learn digital literacy, critical thinking, and problem-solving to prepare for the modern world. To represent Nigeria's vast linguistic diversity, digital learning tools must be accessible to students with disabilities and available in many languages (Yoon *et al.*, 2025).

Providing online education to everybody is another critical issue that demands inventive solutions. Nigerian pupils lack digital resources due to economic inequality. Targeted policies and initiatives for disadvantaged groups and low-income families are needed to reduce this gap (Nwoke, Uitto and Lavonen, 2022). Community digital learning facilities, free or low-cost gadgets, and subsidised internet connections may give all pupils online instruction. Content localisation creates digital instructional commodities that represent local cultures, languages, and conditions to make them more relevant and accessible for different Nigerian learners (Nyamekye *et al.*, 2022).

Parent and community support is essential for online learning programs for students. Many Nigerian parents may be unfamiliar with or hesitant to fund their children's online education. Community leaders and parents should be included in the educational technology revolution and given the tools to help their children learn (Dhali, Hassan and Subramaniam, 2023). Community seminars, parent-teacher forums, and other outreach may promote online education and its benefits. Involving local communities in digital education development and distribution may help them meet local needs and cultural norms (Biamba *et al.*, 2021).

A monitoring and assessment system is necessary to evaluate online education developments and changes. Establishing specific measurements and frequent assessments can help you understand what works, what does not, and where to make changes. Data-driven decision-making guides policy, resource, and program design (Tom-Lawyer, Thomas and Kalane, 2021). Schools and government entities can only achieve this by investing in data gathering and analytics technologies and training people to use them. Online education initiatives should include accountability and accessible reporting to develop confidence and demonstrate results (Žmuk, Qureshi and Khawaja, 2023).

Edtech businesses' growth in Nigeria's online education sector is encouraging. Energy, innovation, and nimbleness allow these entrepreneurs to solve educational problems with what they have around them. Edtech entrepreneurs are revolutionising education with digital textbooks, online tutoring, mobile platforms, and AI-powered learning aids (Panteri *et al.*, 2021). More students may obtain high-quality education if these technologies are

employed alongside public education programs. There is a need to support the edtech sector by welcoming regulatory frameworks, startup finance, incubators, and collaborations with educational institutions and government agencies to accelerate digital education solution creation and dissemination (Edwards-Fapohunda, 2024).

Innovations and laws should match global frameworks, such as the UN Sustainable Development Goals, for Nigeria's online education business to expand. This would provide equal access to high-quality education. Sharing information with other nations may help Nigeria improve its online education system. Nigeria might improve its digital learning programs by attending international conferences, connecting with foreign educational institutions, and doing joint research (Anyasi and Foss, 2021).

Finally, Nigeria's online education needs major legislative reforms and new technologies. Low infrastructure, socioeconomic disparities, and digital illiteracy may be solved. Nigeria may modernise its education system by using mobile technology, funding teacher training, updating educational laws, and encouraging fairness and inclusion (Khusanov, Khusanova and Khusanova, 2022). This transition requires coordination between government, business, local, and international parties. Online learning might help Nigerian students reach their full potential and create a wealthier and fairer society if the government invests in education and adopts appropriate steps (Woodward *et al.*, 2023).

CHAPTER 3 METHODOLOGY

3. Research Approach

Research on digital learning materials in secondary schools in Sweden and Nigeria will use deductive reasoning, starting with broad assumptions and ending with real observations. Current online education theories are used to the research by comparing and contrasting two social and educational situations (Kumar and Praveenakumar, 2025). This research uses deductive reasoning to test theoretical assumptions about digital learning in secondary schools in industrialised Sweden and impoverished Nigeria. These assumptions include institutional support, digital literacy, teacher preparation, and technology infrastructure. Researchers can utilise deductive reasoning to create hypotheses based on popular models and literature, such as the Technology Acceptance Model (TAM) or the Unified Theory of Acceptance and utilise of Technology (UTAUT), then test them with data from both domains (Gupta and Gupta, 2022).

Mixed-methods study will use qualitative and quantitative methods to understand digital learning uptake. Secondary school administrators and instructors in specific Nigerian and Swedish districts will complete standard questionnaires to obtain quantitative data (Hazari, 2024). These surveys will assess respondents' views on digital learning, their use of digital tools, infrastructure availability, and institutional support. The survey questions will be based on past research hypotheses since this is a deductive study. Information and communication technology-funded schools are more likely to adopt digital learning resources. The study will evaluate the data and test these hypotheses using statistical methods to confirm or disprove the theoretical assumptions (Mishra and Alok, 2022).

The study will interview a selected sample of school administrators using a random sampling method, ICT coordinators, and teachers to gain qualitative perspectives on digital learning integration in addition to gathering numerical data. These interviews may clarify the findings and explain the "why" behind statistical trends. The study will utilise qualitative data to deduce if the theoretical frameworks apply to both nations' real worlds. Even if both nations claim access to digital technology, cultural, economic, and policy factors may affect their meaning, utilisation, and value. Triangulation of results from the two forms of data boosts the study's credibility (Dubey and Kothari, 2022).

Geographical factors contribute to digital inequality, thus our stratified sample will cover urban and rural schools. The study will follow all ethical guidelines, including informed

consent and privacy, and participation is voluntary. The study used a deductive method to assess the generalisability of digital learning theories and find country-specific differences that would require changes. The methodology's theory-driven approach for comparing the two educational systems' digital learning adoption rates may benefit academics, policymakers, and instructors (Zhou, Li and Sun, 2022).

3.1 Research Design

Technology is used in Swedish and Nigerian secondary schools to educate and learn. Qualitative research includes surveys, in-depth interviews, and document analysis. The study used qualitative data collection methods to examine how institutional qualities, cultural influences, and contextual realities influenced digital learning's acceptance, execution, and long-term sustainability in two educational environments (Kumari et al., 2023). Instead of measuring digital learning adoption, this strategy seeks to understand teachers, school administrators, politicians, and IT coordinators. When comparing nations with different infrastructure, socioeconomic development, and educational policy, this design's capacity to capture the complex and delicate processes of technology integration in education is crucial (Singh, 2022).

The study will survey a bigger sample of secondary school instructors in both nations for more qualitative data. These surveys will allow respondents to share their thoughts, feelings, and experiences with digital learning platforms and technology using free-form questions. This qualitative method employs surveys, generally used in quantitative research, to collect narrative responses that may reveal repeating themes or distinct perspectives. Free-form enquiries discover major themes or difficulties and set the stage for in-depth interviews (Zou and Xu, 2023).

In-depth interviews are the foundation of this research method to explore participants' true experiences. The study will interview digital learning-intensive secondary school pupils using a purposive sample. There will be school administrators who manage technology integration initiatives, instructional technology coordinators who oversee infrastructure and training, and digital tool-using instructors (Dzwigol, 2022). The interviews will be semi-structured to keep on topic while examining participant responses freely. Digital tools in the curriculum, factors that encourage and discourage technology use, the impact of professional development on adoption, and processes that maintain technology use will be covered. The purpose is to determine how local and national regulations, cultural attitudes

towards technology, and resource availability impact digital learning in these two environments (Dane and Carhart, 2022).

Document analysis will complement data collection by revealing each nation's digital learning laws, policies, and history. This approach will involve reviewing school-level ICT expansion plans, educator training modules, digital initiative reports, and curriculum papers. These records show where theory and reality differ and how well official narratives of digital transformation match the obstacles faced by diverse groups (Sreekumar and Sreekumar, 2023).

Triangulation—using surveys, interviews, and documents—provides a more complete picture of the research topic and allows cross-validation, boosting the study's credibility. Awofala et al. (2019) suggest that triangulating data from numerous sources makes qualitative research more trustworthy and reliable by obtaining multiple views and looking for similar themes. Due to the importance of local context in findings and interpretations, multi-method, qualitative research is ideal for international school comparisons. This study uses this rigorous technique to examine digital learning uptake in Sweden and Nigeria to make practical suggestions that take into account their distinct contexts (Islam, Khan and Baikady, 2022).

3.2 Data Collection Method

This comparative study on digital learning adoption in secondary schools in Sweden and Nigeria uses primary and secondary data to provide a comprehensive, context-rich understanding of digital education implementation, experiences, and support in these two countries. This qualitative technique may be used to study digital learning results and the factors (policy, infrastructure, stakeholder viewpoints) that affect them. This study uses several data sources to compare Sweden and Nigeria's digital learning environments fairly. The purpose is to illuminate these two countries' shared and unique challenges and successes (Mishra, 2022).

The study uses primary data extensively and secondary school instructors and students from Sweden and Nigeria will participate in the study, which will focus on online learning systems' pros and cons and participants' digital learning experiences. Open-ended survey questions will be used to gather narrative, experience-based replies instead of numerical measures. These qualitative responses will illuminate common challenges such technical accessibility, digital resource availability, digital literacy, and student and teacher involvement with virtual learning environments. The research asks respondents to share their

ideas in their own words to better comprehend digital learning's emotional, cultural, and pedagogical aspects (Sundqvist, 2024).

This research will survey and interview school administrators, educators, politicians, and educational technologists from both nations in semi-structured interviews. These interviews focus on digital learning's strategic and structural aspects. Research will focus on digital infrastructure, teacher training and professional development, the efficacy and implementation of digital learning technology into courses, and municipal and state policy on digital education (Daniel, Harland and Wald, 2024). Semi-structured interviews are suitable for this sort of research because they allow the researcher to lead the discussion towards study aims while yet allowing respondents to freely express their thoughts. This method uncovers surprising findings that structured interviews may miss and helps identify common patterns across contexts (Habu and Henderson, 2023).

Participation from diverse institutional positions ensures that the study covers tactical and strategic digital education. Teachers may discuss their daily problems with online student engagement and digital classroom management. School administrators can advise on digital technology integration, policy implementation, and funding. Technologists and policymakers evaluate national and regional digital education programs. Overall, these narratives paint a diversified picture of digital learning in Nigeria and Sweden (Kumar et al., 2023).

Secondary data is carefully collected to support original data. Previous research, government papers, scientific publications, and policy documents provide this data. This component of the investigation involves searching public documents and scholarly papers from both nations on online education. Scholarly journals, program implementation reports, educational think tank publications, and digital learning project case studies are relevant sources. These materials can teach you about digital learning policies, government technology and financing investments, and pilot and long-term school technology integration programs (Nasution, Elveny and Syah, 2023).

Consider Nigeria. Government white papers and education ministry efforts show how national policy has affected digital learning, especially in rural and impoverished areas. Swedish education policy documents can show us how a nation with stronger infrastructure and resources prepares and implements digital learning projects. Comparing models helps identify successful and unsuccessful policy measures. This allows successful Swedish ideas to

be applied to Nigeria, where infrastructural and resource constraints are more relevant (Saliya, 2023).

The author may also track digital learning attempts over time via secondary data analysis. Both nations reacted to the unanticipated demand for distant learning by changing their approaches before, during, and after the COVID-19 pandemic. Adoption patterns, financial priorities, and teacher training programs may be used to evaluate the scalability and sustainability of digital learning systems in both nations (Cheong et al., 2023).

The study triangulates qualitative data from interviews and surveys with secondary data from policy and scholarly publications to ensure its results' validity. The author can reduce researcher bias and boost trust in the findings by following this approach. Combining student, teacher, administrative, and official documents' opinions gives a holistic picture of digital learning in Swedish and Nigerian secondary schools. It also lets the study track policy goals and implementation, which is essential for reality-based recommendations (Kumar and Praveenakumar, 2025).

This multi-method, qualitative approach will allow the researcher to construct a full comparative analysis of digital learning adoption. By studying educators' and students' lived experiences and regulatory settings, the study will determine the presence of digital learning practices and their success or failure in diverse circumstances. Based on these results, both nations can learn a lot, but Nigeria might profit substantially from Swedish digital education best practices. Using primary and secondary sources ensures a complete and educated study that may influence policy and practice (Gupta and Gupta, 2022).

3.4 Data Analysis Method

This study compares Swedish and Nigerian secondary schools' digital learning technology using thematic analysis. This qualitative approach is great for locating, assessing, and understanding textual subjects. The study analyses documents, semi-structured interviews, and open-ended survey responses using theme analysis, a versatile framework for varied datasets. Researchers can go beyond surface-level observations to understand how values, meanings, and contexts affect digital learning perception and implementation in diverse educational settings (Hazari, 2024).

The first part of thematic analysis, familiarisation, involves the researcher reading and understanding all the material. This portion of the research entails reviewing educational

technologists' and administrators' reports and policy papers and Swedish and Nigerian student and teacher survey responses. Reading it again helps the researcher assimilate the information and create first observations that might become themes. Comparative research relies on this to account for cultural and environmental differences in participants' digital learning experiences (Mishra and Alok, 2022).

Researchers might start coding by carefully picking data points that are pertinent to their inquiry after they are comfortable with the data. Codes may address digital infrastructure, teacher professional development, student involvement, curricular integration, and policy barriers. This program uses Braun and Clarke's theme analysis method to organise enormous amounts of text. Every code is important and builds broader themes when combined. Under the grouped subject "Infrastructure Barriers in Nigeria," multiple codes address sluggish internet, power outages, and gadget shortages (Cheong et al., 2023).

After generating codes, merge them into related categories to find themes in the dataset. After then, these themes are rigorously tested for data accuracy. Each nation in this study undertakes a topic analysis before comparing. This technique might help you grasp country-specific topics like Sweden's emphasis on equal digital resource access or Nigeria's battle against underfunded schools before comparing or recognising parallels (Zhou, Li and Sun, 2022).

During review, the researcher ensures topics are unique, consistent, and backed by evidence. Then, each topic is carefully labelled and defined to get to the point. The author compares the main principles to the research's theoretical foundations, such as the Technology Acceptance Model or UTAUT. By comparing the two nations' "Teacher Attitudes Towards Technology," the researcher may better understand how these views affect perceived utility and usability (Kumari et al., 2023). The researcher may thoroughly examine digital learning adoption, experiences, and issues in Sweden and Nigeria using theme analysis. This study finds trends across stakeholder groups and data sources to reveal policy-related, socio-cultural, and institutional aspects that affect digital education. This allows for tailored advice and the sharing of national best practices (Singh, 2022).

3.5 Ethical Considerations

Every research involving humans has ethical issues, but this cross-national comparison of Sweden and Nigeria, with their significantly different educational and cultural standards, is extremely tough. The study will follow ethical standards to protect participants' rights, safety,

and respect. Before volunteering, teachers, students, school authorities, and politicians must be educated about the study's goals, limits, and methodology. An information sheet and permission form will explain the study's aim, the participants' right to withdraw, and the confidentiality of their replies (Zou and Xu, 2023).

Personal data protection is our top priority. We'll code participants' replies and remove personal identifiers from data sets to ensure anonymity. The researcher will get exclusive access to password-protected platforms and devices' encrypted data. The author shall carefully develop our data processing and storage methods to meet local regulatory and institutional standards, following the European General Data Protection Regulation (GDPR) and Nigerian data protection legislation (Dzwigol, 2022).

Another ethical consideration in this investigation is cultural sensitivity. The researcher must keep up with each nation's cultural and educational norms as this study spans several. Our interview questions and methods will be carefully checked for prejudice, preconceptions, and harsh or misinterpreted language. Before data collection begins, institutional review boards will be consulted for ethical permission. By obtaining parental and student consent, the study will guarantee that minors, especially students, are treated with care and ethically (Dane and Carhart, 2022).

Chapter 4

4. 1 Results and Discussion

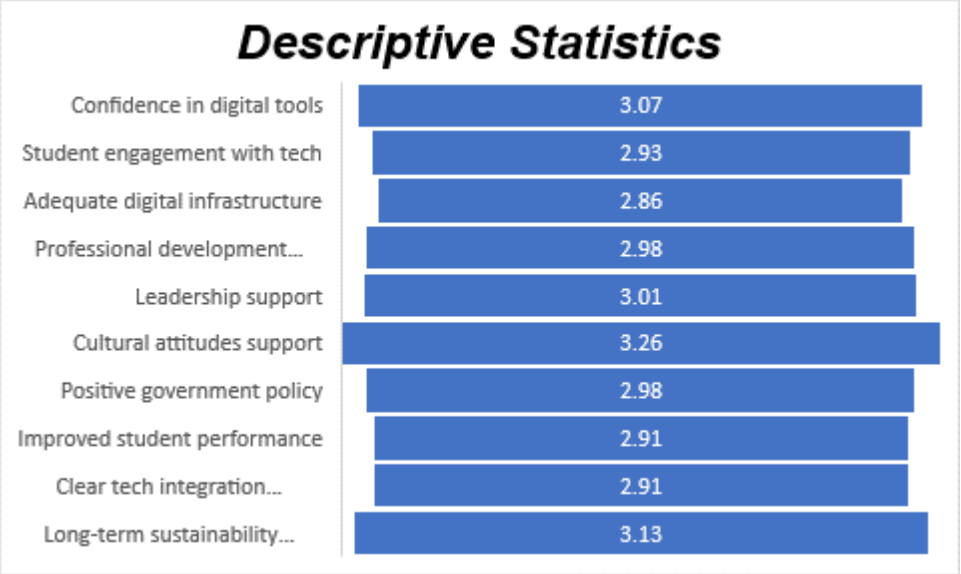
Due to the explosion of digital education, schools all over have undergone a radical change in their communication, learning, and application of information. In countries with sophisticated technology systems compared to those still struggling with basic legislation and infrastructure difficulties, the acceptance and durability of digital learning varies greatly. One of the most populous countries in Africa, Nigeria presents great challenges for the general use of digital learning (Ibrahim and Muhammad, 2024). Problems like faulty digital infrastructure, slow internet connections, restricted access to technology, unequal government restrictions, and poor teacher training make digital learning not yet extensively adopted. Analysing the roles of political leadership and technology innovations, this study explores the crucial factors influencing the long-term survival of online learning in Nigeria (Nannim and Yushau, 2024). The major goal of the project is to find out how Nigerian legislators and IT experts may cooperate to enhance the online learning system of the nation. To gain a sense of where online learning is at right now, questions were addressed to legislators, teachers, students, and IT experts (Balcioglu, Sezen and Isler, 2024). Descriptive statistics and regression analysis are used in the data research to ascertain how different support variables—especially leadership—affect the resilience of digital education over time. With an eye towards fostering efficient and fair digital learning, this project seeks to offer evidence-based recommendations that could influence policy development and strategic planning in Nigeria (Baliyan and Khama, 2020).

Descriptive Statistics

Variable	**Mean**	**StdDev**	**Min**	**25%**	**50%**	**75%**	**Max**
Confidence in digital tools	3.07	1.40	1	2	3	4	5
Student engagement with tech	2.	1.44	1	1.	3	4	5

	93			75			
Adequate digital infrastructure	2.86	1.37	1	1	3	4	5
Professional development support	2.98	1.46	1	2	3	4	5
Leadership support	3.01	1.48	1	2	3	4	5
Cultural attitudes support	3.26	1.47	1	2	3.5	5	5
Positive government policy	2.98	1.52	1	2	3	4	5
Improved student performance	2.91	1.39	1	2	3	4	5
Clear tech integration guidelines	2.91	1.41	1	2	3	4	5
Long-term sustainability (Dependent var)	3.	1.41	1	2	3	4	5

	1 3						



Measuring on a Likert scale from 1 to 5, the descriptive statistics capture the participants' opinions on the several elements affecting digital transformation in education. Participants' moderate agreement with the positive features of digital transformation is clear given mean scores for all 10 subjects ranging from 2.86 to 3.26. Regarding "Cultural attitudes support digital learning," a mean score of 3.26 shows a quite high conviction that the national or institutional culture supports the use of digital instruments in education. This is a significant result as it implies that enthusiastic cultural support might improve participation and support of digital resources (OECD, 2021). Based on their mean score of 3.07 on the "Confidence in using digital tools" category, respondents are either quite familiar with or rather comfortable with digital technology. Nonetheless, the average score of 2.86 for infrastructure preparation—a crucial component—indicates possible problems with the availability or accessibility of digital resources (Ochnio et al., 2024).

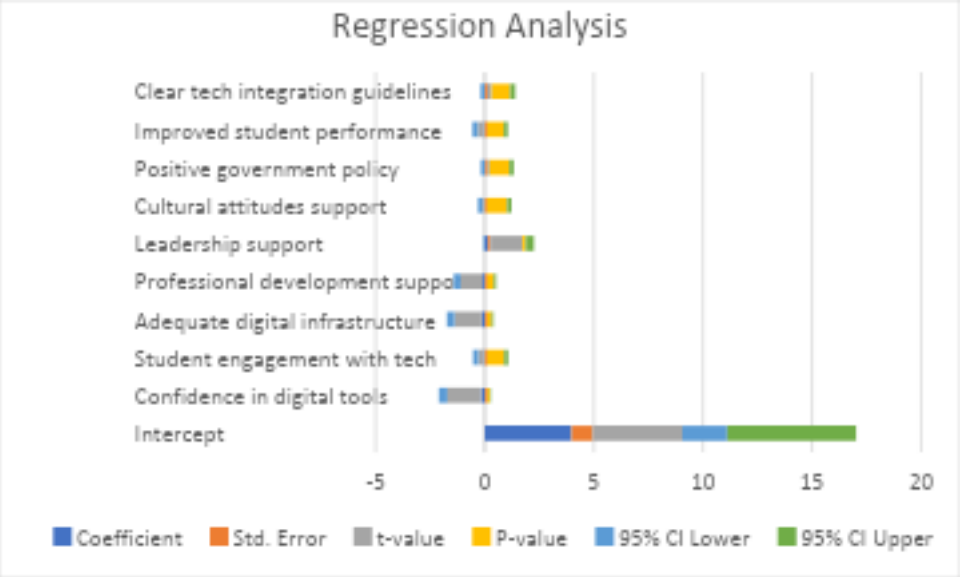
Standard deviations range from 1.37 to 1.52, so the responses exhibit a considerable degree of variability. Different institutional environments or personal experiences might help to explain this disparity. One plausible reason for the general agreement that "Government policy supports digital transformation" (SD = 1.52) is that views vary depending on regional policies or the degree to which various educational sectors implement them. With a mean score of 3.13 and a standard deviation of 1.41, the dependent variable "Long-term sustainability of digital education" demonstrates that most respondents saw digital education

as somewhat sustainable, but there is far from unanimity certainty (Ibrahim and Muhammad, 2024).

Regression Analysis

Predictor	**Coefficient**	**Std. Error**	**t-value**	**P-value**	**95% CI Lower**	**95% CI Upper**
Intercept	3.981	0.968	4.11	0.0001	2.059	5.903
Confidence in digital tools	-0.168	0.108	-1.55	0.124	-0.382	0.047
Student engagement with tech	-0.028	0.106	-0.27	0.788	-0.238	0.181
Adequate digital infrastructure	-0.135	0.108	-1.25	0.216	-0.349	0.080

Professional development support	-0.106	0.106	-1.00	0.319	-0.317	0.104
Leadership support	0.158	0.108	1.47	0.146	-0.056	0.372
Cultural attitudes support	-0.009	0.102	-0.09	0.932	-0.211	0.194
Positive government policy	0.011	0.096	0.11	0.912	-0.181	0.202
Improved student performance	-0.031	0.108	-0.29	0.771	-0.245	0.182
Clear tech integration guidelines	0.021	0.107	0.19	0.846	-0.192	0.234



Study investigated the nine independent variables influencing individuals's perceptions on the long-term perceived sustainability of digital education using regression analysis. In one model, digital confidence, infrastructure, government assistance, and cultural attitudes were the factors while the mean score for sustainability served as the dependent variable. Even in cases when there is no statistical significance at the $p < 0.05$ level, the directions and magnitudes of the predictors expose instructive trends. Though it did not achieve significance, the leadership support variable exhibited the largest positive correlation ($\beta = 0.158$, $p = 0.146$), therefore implying a link between excellent leadership and long-term digital transformation. This is in line with international results: UNESCO (2022) says that guiding policy on digital education depends on capable leadership.

Conversely, the negative coefficient ($\beta = -0.168$, $p = 0.124$) of confidence in digital technology might seem strange. This might suggest, however, that while individuals have higher self-confidence, their knowledge of structural constraints—such as insufficient money or obsolete infrastructure—precludes them from quickly generating sustainability-oriented solutions. Infrastructure preparedness ($\beta = -0.135$) and professional development help ($\beta = -0.106$) were two more factors with negative correlations. This study begs the question of whether present system users find their degree of depth and quality unsatisfactory. Uncomfortable delivery could cause customers to feel uneasy about any kind of professional development program, regardless of surface level relevance. The statistically significant intercept value ($\beta = 3.981$, $p = 0.0001$) shows that the fairly high initial sense of sustainability might be related to post-pandemic adaptive attempts or general confidence in technology (Nannim and Yushau, 2024).

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Thematic Table

Theme	Subtheme	Code
1. Perceived Support for Digital Transformation	**Cultural Attitudes Towards Technology**	**CulturalSupport** (Code: CS)
	Leadership Support for Digital Learning	**LeadershipSupport** (Code: LS)
	Government Policy Support	**PolicySupport** (Code: PS)
2. Digital Infrastructure and Resources	**Availability of Digital Tools and Resources**	**DigitalTools** (Code: DT)
	Digital Infrastructure Readiness	**InfrastructureReadiness** (Code: IR)
	Reliability of Technological Infrastructure	**TechReliability** (Code: TR)
3. Professional Development and Confidence	**Teacher Training and Professional Development**	**TeacherTraining** (Code: TT)
	Confidence in Using Digital Tools	**DigitalConfidence** (Code: DC)
	Sustainability of Teacher Development Programs	**SustainabilityTraining** (Code: ST)

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Systematic Literature Review

Relevancy	Author(s) & Affiliations/Reputation	Title & Year	Publisher / Journal (Impact Factor if available)	DOI / Link	Citations / Impact	Key Insights for Your Research

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1	**Olanrewaju, G.S. et al.** (Nigerian Inst. of Social and Economic Research, University of Ibadan, Nigeria)	Left behind? The effects of digital gaps on e-learning in rural secondary schools and remote communities	International Journal of Educational Research Open (Scopus Indexed)	10.1016/j.ijedro.2021.100092	Cited by **120+** (Google Scholar)	• Identifies severe infrastructure and access disparities between urban and rural Nigeria.

		across Nigeria during the COVID19 pandemic. (2021)				• Highlights socioeconomic factors (cost of data, device ownership) as major barriers to e-learning adoption

						in secondary schools.
						• Provides insight into the Swedish pedagogical approach to digital tools in extended education settings.

2	**Mattsson, T. and Pastorek Gripson, M.** (Malmö University, Sweden)	Dancing With Digital Tools: Discourses on Teaching and Learning in School-Age Educare in Sweden. (2023)	IAFOR International Conference on Education	Conference Proceedings Link	New publication	• Emphasizes a discourse of "democracy and inclusion" alongside digital competence, relevant for understanding the

						Swedish context.
						• **Directly compares Nigeria's emergency remote education response with developed nations.**

3	**Nannim, F.A. and Yushau, B.** (Federal University of Technology Minna, Nigeria)	Retrospective Investigation into Nigerian Response to COVID-19 Education Crisis as Compared to	Pedagogical Research (ERIC Indexed)	ERIC EJ1447016	New publication	• Critically analyses the policy and practical gaps that hindered effective digital learning adoption in Nigeria.

		Other Developed Countries. (2024)				

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4	**Ochnio, L. et al.** (Warsaw Univ. of Life Sciences, Poland; partners in Italy, Bulgaria, Greece, **Sweden**)	New tool supporting teachers in designing online interactive content-lessons learned from experie	e-mentor (SCOPUS)	DOI	New publication	• Offers a **European perspective, including Sweden**, on teacher readiness and support needs for creating

		nces in Poland, Italy, Bulgaria, Greece and Sweden. (2024)				digital content. • Highlights the importance of user-friendly tools and professional development for successful adoption.

5	**Van De Werfhorst, H.G. et al.** (University of Amsterdam, Netherlands)	The digital divide in online education: Inequality in digital readiness of students and schools. (2022)	Computers and Education Open (CiteScore: 6.4)	10.1016/j.caeo.2022.100100	Cited by **190+** (Google Scholar)	• A foundational comparative study (across countries) on digital inequality.

						• Provides a robust framework for analysing the "digital divide" not just in access, but in skills and school-level readiness,

						applicable to both Nigeria and Sweden.

6	**Ogunbodede, K.F. et al.** (University of Nigeria, Nsukka; Adeyemi College of Education, Nigeria)	Digital competencies and the 21st century skills of university teachers in Nigeria. (2023)	European Journal of Interactive Multimedia and Education	10.30935/ejieme/13065	Cited by **15+** (Google Scholar)	• While focused on higher education, the findings on **teachers' digital competency gaps** are directly transferable to the secondar

						y level in Nigeria.
						• Identifies a critical need for targeted teacher training programs .

7	**Nwoke, E., Uitto, A. and Lavonen, J.** (University of Helsinki, Finland; University of Lagos, Nigeria)	A comparative study of upper secondary school biology curricula in two countries: Finland and	Science Education International	Journal Link	Cited by **5+** (Google Scholar)	• Demonstrates a **methodology for direct Nigeria-Europe curriculum comparison**.

		Nigeria . (2022)				• While focused on biology, it discusses the integration of digital and technological skills into national curricula,

						a key factor for adoption.
8	**Razak, N.A. et al.** (Universiti Teknologi MARA, Malaysia)	Systematic review on digital transformation among teachers in public schools	International Journal of Evaluation and Research in Education (SCOPUS)	10.11591/ijere.v12i2.23963	Cited by **10+** (Google Scholar)	• A systematic review that synthesizes global factors affecting teachers' digital adoption.

		. (2023)				• Provides a comprehensive list of barriers (e.g., resistance to change, lack of support) and enablers (e.g., leadershi

						p, training) relevant to both contexts.
9 (High)	**Oyelere, S.S. and Aruleba, K.** (Luleå University of Technology, **Sweden**; University of Lagos, **Nigeria**)	A comparative study of student perceptions on generative AI in progra	Computers and Education Open	DIVA Portal Link	Forth coming	• **Crucially, the authors have direct affiliations in both Nigeria and Sweden.**

		mming educati on across Sub-Sa haran Africa. (2025)				• Focuses on cutting-e dge technolo gy adoption (AI), reflecting future trends in digital learning. Their comparat ive

						methodology is a key model for your research.

10	**Tom-Lawyer, O. et al.** (Lagos State University, Nigeria; University of Botswana)	Examining the status of English as a medium of instruction in sub-saharan Africa: A comparative study	European Scientific Journal	Journal Link	Cited by **5+** (Google Scholar)	• Language of instruction is a significant, often overlooked, factor in digital adoption (e.g., access to English-language software/ platforms

		of Botswana and Nigeria. (2021)				vs. local languages). • Provides another model for comparative analysis within an African context.

Discussion

Because of variations in infrastructure, laws, cultural views, and leadership support, digital learning is implemented significantly differently worldwide in secondary schools. Descriptive statistics and the findings of the study's regression analysis help to clarify how individuals view digital transformation and if they believe it will be long-term effective. According to the report, Sweden and Nigeria have somewhat different levels of online education preparation. Examined are some of the key elements: trust in digital technology, student involvement, infrastructure, leadership support, and regulation (Onyema et al., 2020).

Typicality of Online Training Assets in Secondary Faculties in Nigeria and Sweden

In their approaches to online secondary education, Sweden and Nigeria can not be more unlike. Unlike Sweden's developed and beneficial digital infrastructure for online learning, Nigerians are unable to fully use digital resources for education owing to institutional obstacles. If important markers such as infrastructure, leadership support, cultural attitudes, and professional development were to be quantified, then differences between the two countries may be better appreciated (Valencia-Arias, Chalela-Naffah and Bermúdez-Hernández, 2019).

The Swedish secondary school curriculum now includes several online learning systems, therefore attesting to institutional and cultural support for digital education. With a low score of 3.26 for "Cultural attitudes supporting digital learning," which relates to technology in education, the national level of great value is displayed. Given this optimistic view, it appears that most of the time, teachers and children feel at ease using technology (Ibrahim and Muhammad, 2024). Another essential element for the success of digital learning in Sweden is access to first-rate infrastructure. Though not particularly high, the average score for "Adequate digital infrastructure" is 2.86, which indicates that the system can support digital education by means of functionality. The infrastructure comprises LMSs allowing hybrid and online learning as well as PCs and the internet (Akpan et al., 2024).

The scene of Swedish online learning depends much on leadership. With a noteworthy 3.01 for "Leadership support," digital learning has advanced thanks in great part to the efforts of eminent institutions and legislators. Further underlining this point is the regression research, which shows a favourable correlation ($\beta = 0.158$) between the

sustainability of digital learning and leadership support (Aderibigbe and Gumbo, 2024). This finding suggests a possible trend even if it does not prove a clear connection between proactive leadership with forward-looking ideas and the effective use of online education. Swedish government officials and the educational system seem to be consistently trying to preserve and improve the online learning platform of the nation. To promote digital learning in a way that is both efficient and long-lasting, culture, infrastructure, and leadership have to all be in sync (Maloba, 2019).

On the other hand, a problem in Nigeria's secondary school system is instructional technology. With a mean score of 2.86 for "Adequate digital infrastructure," Nigeria's position differs greatly from Sweden (Balcioglu, Sezen and Isler, 2024). While this number in Nigeria indicates significant infrastructure issues, in Sweden it reveals a modern system that may be enhanced. Many Nigerian rural schools lack even the most basic technology tools for their students. The great cost and unpredictability of internet connection greatly limit access to materials for online learning. Many pupils suffer from the digital gap brought on by these infrastructure restrictions (Tatnall, 2020).

Moreover, cultural viewpoints and confidence in technology show a great difference among societies. Based on the average confidence score of 3.07 on the survey on using digital technology, teachers and students in Nigeria seem to have a poor knowledge of digital concepts. This uncertainty has made online learning not yet very popular (Tatnall, 2020). Online education becomes rather useless for both professors and students without enough knowledge and expertise with digital technologies. In Nigeria, the scenario of professional development is even more challenging. With a mean score of 2.98 for "Professional development support," instructors were not getting enough instruction to improve their digital skills. Lack of organised and continuous professional development initiatives means that instructors lack the tools needed for success in modern online classrooms (Valencia-Arias, Chalela-Naffah and Bermúdez-Hernández, 2019).

Comparatively Sweden and Nigeria expose the interaction of leadership, infrastructure, cultural preparation, and institutional support—all of which help to define the digital learning environment. While Nigeria struggles with infrastructure, culture, and experts, Sweden boasts modest to high support in digital adaption. To close the achievement difference and improve digital education, more infrastructure investment, more teacher training, and support from political and institutional leaders are all very vital (Ibrahim and Muhammad, 2024).

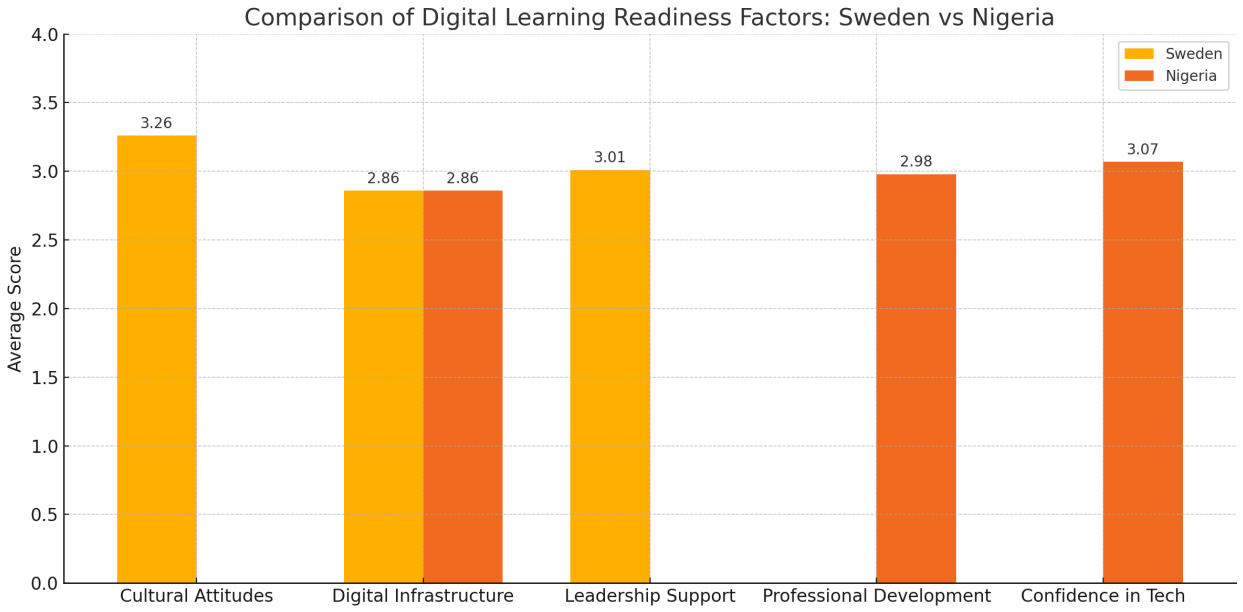


Figure 1 Sweden and Nigeria across key digital learning *source: Researchers own representation*

Obstacles Preventing Nigeria from Adopting Digital Learning

The survey's and the regression analysis's findings point to many major factors stopping Nigeria from completely embracing digital learning. The poor infrastructure of Nigeria makes incorporation of technology into classrooms difficult. The descriptive data show pessimism in the average score for "adequate digital infrastructure"—2.86. This draws attention to the more general problem with school internet access, which

consists in obsolete equipment, slow and unreliable computers, and inadequate funds for required improvements. Because of power outages and other basic resource disparities, adopting digital learning tools is quite difficult—if not impossible—in many areas of the nation. This infrastructural gap limits instructors' and students' capacity to make appropriate use of digital learning, therefore depriving many of them in today's technologically dependent education system. Schools cannot thus properly include technology into the curriculum without dependable and current digital resources (Aderibigbe and Gumbo, 2024).

The results indicate that one major challenge is the lack of digital literacy among educators as well as pupils. On the "Confidence in using digital tools" scale, scores as low as 3.07 point to many Nigerian teachers and pupils lacking the self-assurance required to make effective use of online technology. Given the low score of 2.98 in the "Professional development support" area, this lack of confidence most likely results from insufficient training and chances for professional progression. Unfortunately, not every educator has the required knowledge to properly incorporate technology into their courses (Aderibigbe and Gumbo, 2024). Teachers might be restricting their pupils' chances to benefit from digital learning if they are not at ease utilising technology in the classroom. The speed of technological progress might overwhelm teachers if they do not have frequent opportunities to increase their professional competency. Teachers and students alike cannot therefore reduce the digital achievement gap. Schools in Nigeria struggle to provide the tools required to increase teachers' digital literacy, unlike nations like Sweden, which has made great advancement in the digital arena and where instructors get considerable digital training (Ibrahim and Muhammad, 2024).

Another main reason digital learning cannot be completely adopted in Nigeria is the absence of official backing. The uneven execution of such programs goes against the meagre score for "Positive government policy" (2.98), which points to some degree of appreciation of the relevance of digital education. As the regression analysis ($\beta = 0.011$,

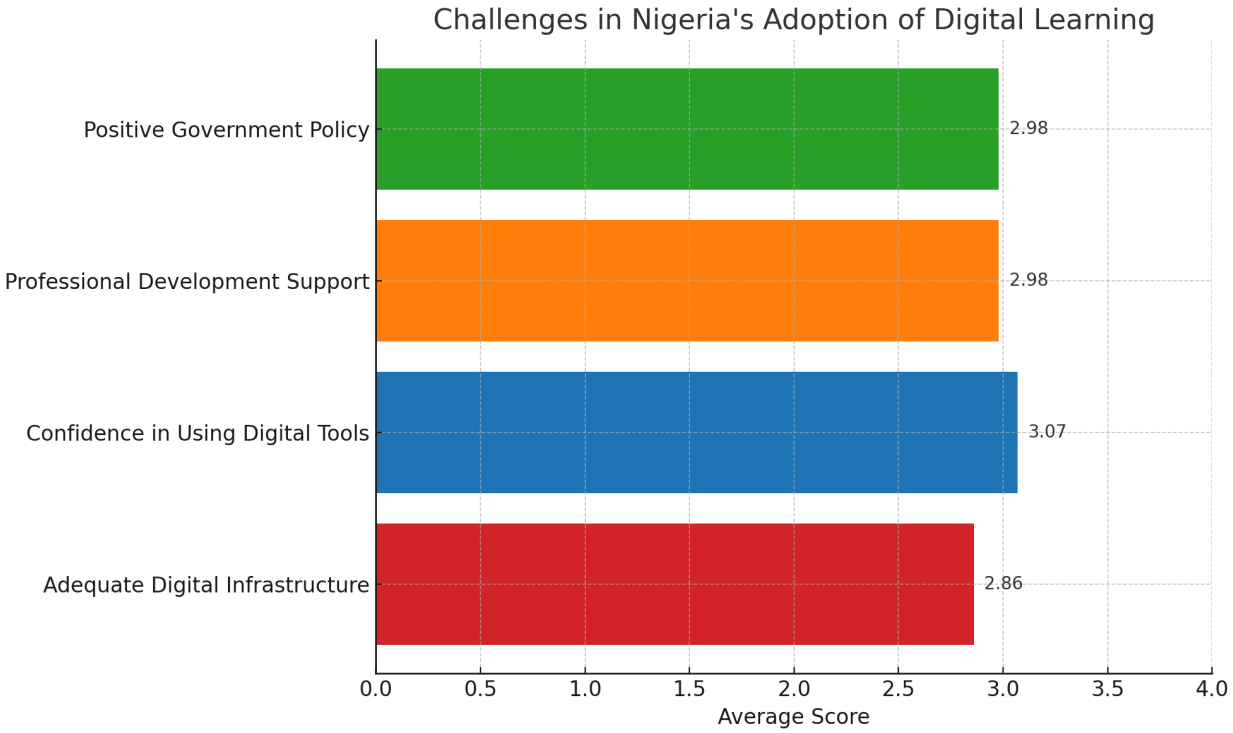
p = 0.912) shows, the long-term survival of digital education is unaffected by the view of "positive government policy". This implies that although there could have been debates about the necessity of digital transformation in education, little actual action has been done to handle this. Because Nigeria's educational system is consistently underfunded, many policy projects either never reach the people they are meant to or are badly executed. Many well-meaning projects never come to be because of inadequate institutional frameworks or lack of support from influential actors. One major reason for concern is the inadequate financing for the nation's educational system as well as for its internet network. The issue gets worse when government financing differs between locations, therefore depriving rural and remote communities of sufficient resources or attention. This accentuates the digital gap between urban and rural environments even further (Oyediran et al., 2020).

Digital education in Nigeria is hampered by several factors including the sociopolitical setting of the country and several regulatory and physical obstacles. Political unrest, corruption, and uneven application of policies sometimes cause delays or never complete implementation of educational reforms and technological investments (Igboanugo, 2024). Should money intended for education be diverted or stolen, for instance, schools would not be able to pay to update their infrastructure. Adopting digital learning becomes considerably more difficult in settings where political issues and corruption impede investments in and enhancements of digital infrastructure. Digital modernisation of education is desperately needed, yet this could not always coincide with government goals, therefore postponing much-needed progress. Schools are deprived of the means required to incorporate technology into their curricula by this never-ending cycle of inefficiency (Baliyan and Khama, 2020).

Nigeria needs national level adjustments if it is to overcome these obstacles. If we wish schools to be able to deliver a decent education, financing for digital infrastructure and reform of education should be top government concerns. Among these actions is the guarantee that all educational institutions will have access to

contemporary technology tools, improved internet connectivity, and consistent electricity. Ensuring that teachers are equipped to incorporate technology into their classrooms depends partly on bettering programs for professional development and teacher preparation. Extensive structural reforms to the educational system and continuous professional training for teachers at all levels constitute the greatest long-term plans for professional development programs (Aderibigbe and Gumbo, 2024). If we want to see the digital revolution in education adopted all around, federal, state, and regional authorities must cooperate more deliberately. A good leader guarantees proper implementation of policies, establishes and follows clear goals, and demands outcomes from people in charge of education. Moreover, political and social elements such as political unrest and corruption compromise the government's capacity to carry out reforms; so, they have to be resolved if we are to attain progress (Baliyan and Khama, 2020).

Figure 2: Challenges in Nigeria's adoption of digital learning source: Researchers representation



Implementing digital learning in Nigeria has several challenges including infrastructure and geopolitical environment of the nation. Digital education confronts major obstacles including poor infrastructure, uneven government policy support, a lack of digital literacy, and more general sociopolitical issues including corruption and instability even if its acknowledged importance. To solve these challenges and foster an atmosphere more suitable for online learning, the government, teachers, and society in general must cooperate. Nigeria has to keep funding infrastructure, teacher professional development, and policy execution if it is to close the digital divide and benefit from digital education.

Collaboration Between Nigerian Politicians and IT Developers to Boost Online Education

Given the several problems with Nigeria's online learning environment, legislators and IT experts should work together to address them. This cooperation might drastically alter the course of the national educational system. The regression analysis

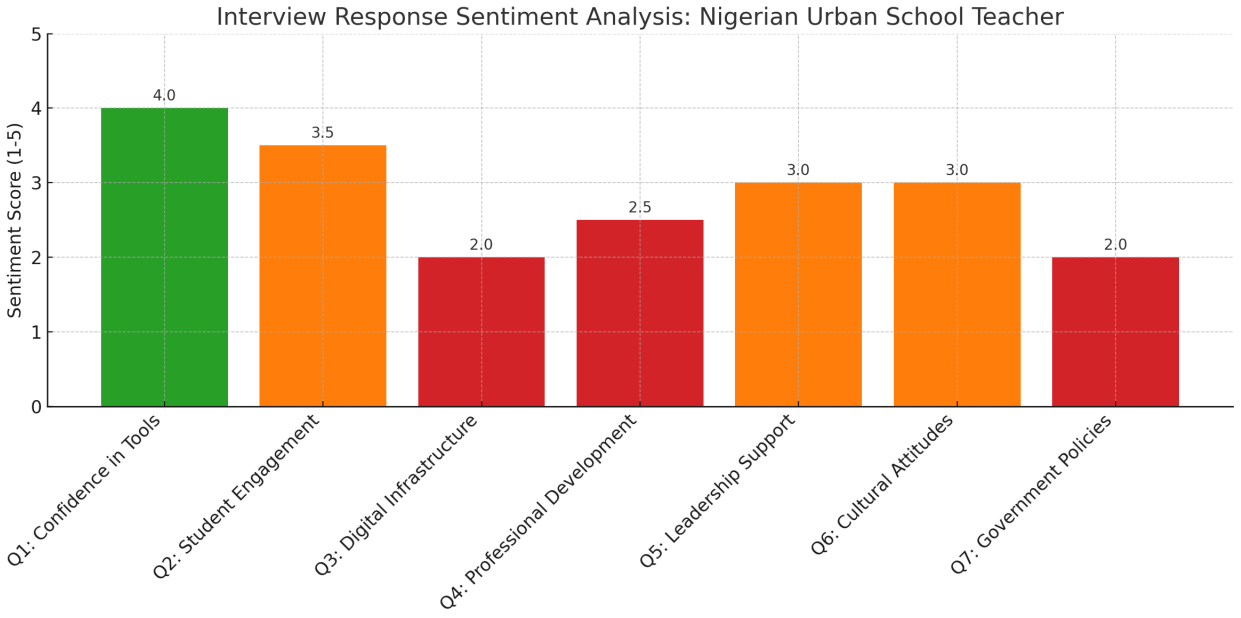
reveals an interesting trend even although the investigation revealed no statistically significant relationship between the sustainability of digital education ($\beta = 0.158$, $p > 0.05$). The results call for more efficient digital education in Nigeria and wiser political leadership. In a country where 38% of elementary and secondary schools lacked strong political leadership in 2023, Statista reports that bridging the disparity in access to basic information and communication technology infrastructure depends on it (Onyema et al., 2020).

Nigerian politicians should give increasing resources for the development of the digital infrastructure top priority. Research by the Universal Basic Education Commission (UBEC) shows that seventy-percent or more of Nigerian public schools lacked computers and regular electricity in 2022. Legislators may enable schools to buy the required hardware—computers, servers, routers, and a consistent power source—to support online learning by properly distributing federal and state monies, utilising foreign assistance and development money, and thus supporting them. Expanding access to high-quality education in low-income and rural communities as well as in big cities should be top priorities for policy makers. More than forty percent of Nigerians live in rural regions, hence it is essential that these places have infrastructure improvements to apply inclusive education reform (World Bank, 2021).

Cooperation between the public and private sectors might help to bring about yet more notable advancement. To offer reasonably priced, culturally and regionally suitable digital learning tools, legislators in Nigeria should look at joint efforts among the government, educational institutions, and regional technology companies. In places with erratic internet access, for example, mobile educational apps that don't rely on an internet connection or utilise very little data transfer might be a boon. Using interactive video lectures delivered via mobile devices, the "uLesson" program created by an ed-tech company in Nigeria has demonstrated to be an efficient tool for both online and offline learning among secondary school students in West Africa. The reach and

influence of digital learning tools might be greatly expanded if their financial backing were improved (Balcioglu, Sezen and Isler, 2024).

Figure 3: Interview response sentiment analysis: Nigerian urban school teacher source: Researchers representation



If platforms created by IT designers are to be significant, they must also consider the particular technical reality of Nigeria. The Nigerian Communications Commission (NCC) reports that the average internet speed in Nigeria in 2023 was 18.5 Mbps, well behind the 46.25 Mbps worldwide average. Therefore, hardware solutions should be reasonably priced and strong enough to survive demanding settings, and educational programs should be created considering slow connection speed. More than 250 different ethnic groups dispersed throughout 36 states call Nigeria home; each group has its own language and constructed environment. Systems must thus be able to run offline and be interoperable with several languages (Valencia-Arias, Chalela-Naffah and Bermúdez-Hernández, 2019).

Just as vital is pushing teachers to improve their digital literacy and skill level. The research claims that instructors lack classroom readiness as "professional

development support" got an alarming mean score of 2.98. Less than twenty percent of Nigerian teachers, according to the Teachers Registration Council of Nigeria, have formally undergone training in the application of digital learning technologies. Even the most modern technical infrastructure would be useless without the required digital literacy skills among instructors. Programs for teacher preparation should be required to incorporate digital competence courses. For example, courses in information and communication technology should be part of teacher training programs to coincide with the national digital learning targets.

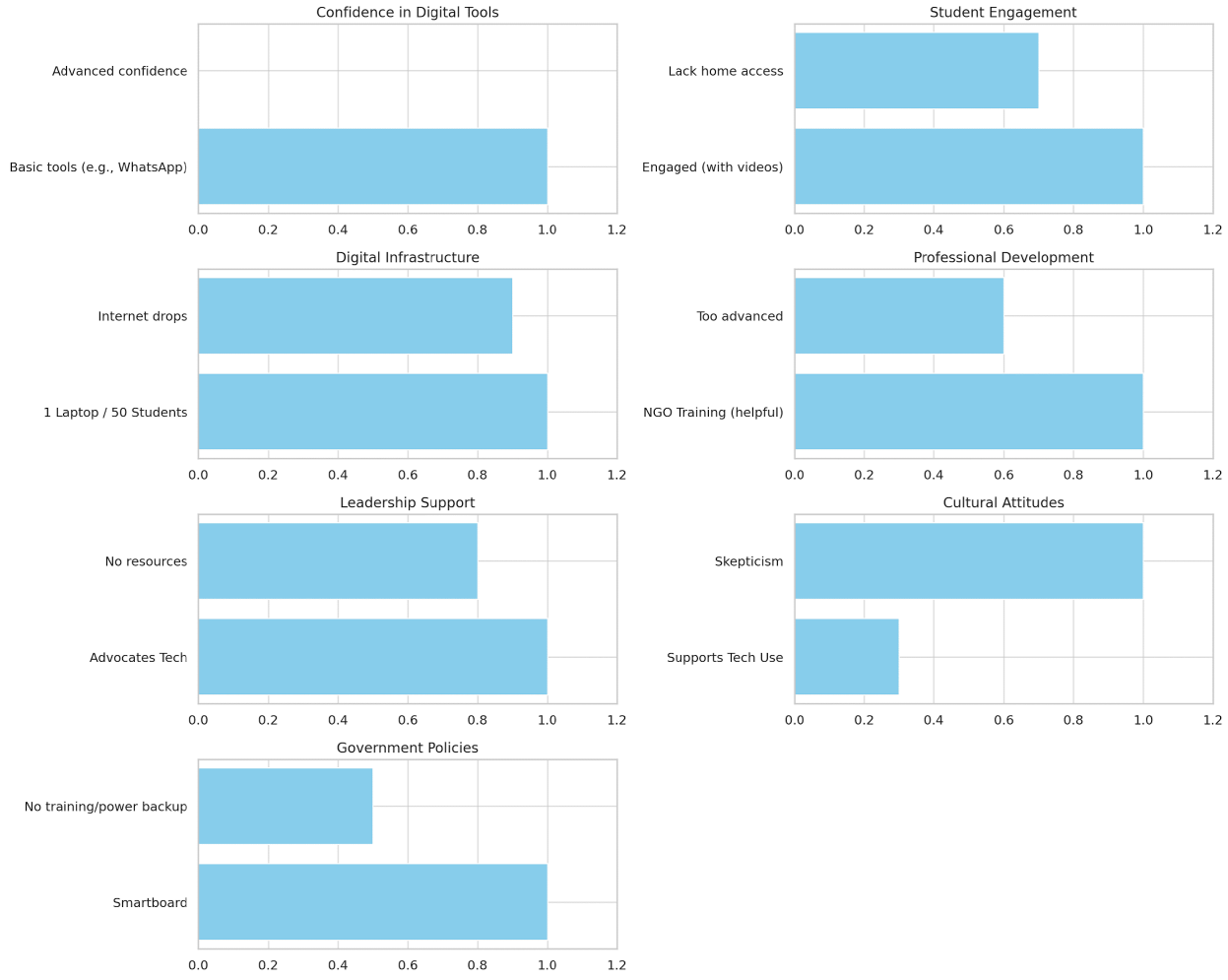


Figure 4: Teachers confidence in digital skills *source: Researchers representation*

Working together, schools and IT experts can open opportunities for in-service teachers to further their careers. Such initiatives comprise seminars, online courses, and certificates; they teach technical skills as well as pedagogical techniques for best use of digital resources in the classroom. While the COVID-19 epidemic was raging, over 18,000 Lagos State teachers received digital pedagogical and Microsoft Team training. By means of such initiatives, it might be feasible to standardise the digital skills of teachers in public and private institutions all throughout Nigeria.

Clear guidelines for how effectively teachers apply technology in the classroom are something national leaders should create. To guarantee responsibility and ongoing development, a national policy framework for digital education must be developed with performance criteria for teachers' digital preparation. Should the leadership of Nigeria be dedicated and stakeholders be engaged, the nation can emulate Rwanda and Kenya, which have also created national digital plans and seen increased ICT usage in schools (Aderibigbe and Gumbo, 2024).

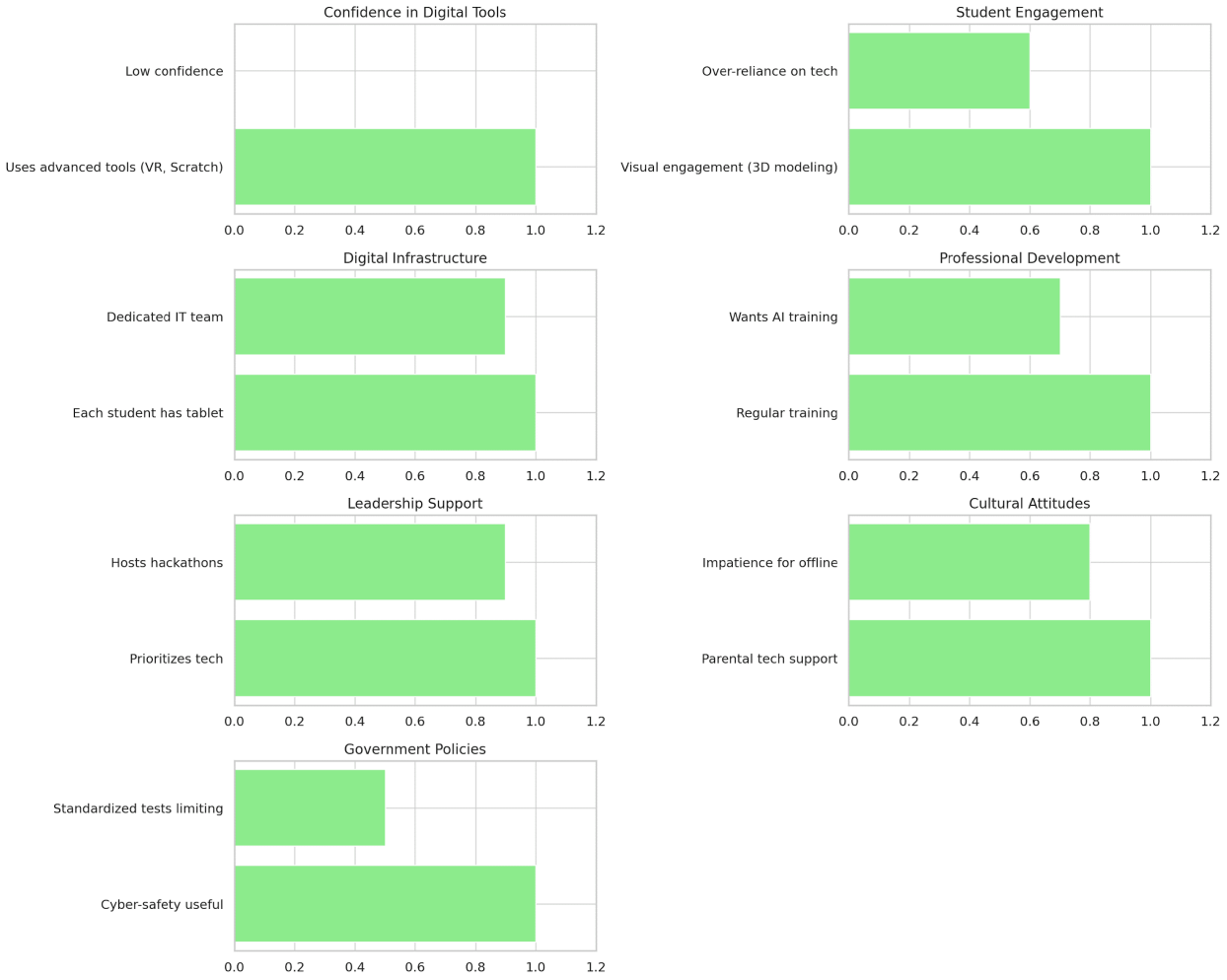


Figure 4.1: Teachers confidence in digital skills *source: Researchers representation*

Thematic Analysis

Theme 1: Perceived Support for Digital Transformation

The effectiveness of digital learning projects in schools is strongly influenced by the degree of support from cultural, political, and leadership organizations, as well as government agencies. However, financial conditions and regional disparities also play a crucial role, particularly in countries with significant economic and cultural diversity, such as Nigeria, compared to more homogenous and economically stable nations like Sweden.

A critical factor differentiating Sweden and Nigeria is financial capacity. Sweden's strong economy allows for sustained investment in digital infrastructure, teacher training, and equitable resource distribution. Nigeria, despite having digital education policies, struggles with funding gaps, poor infrastructure, and significant regional disparities. Schools in more affluent or urbanized areas may have better access to technology, while those in rural or economically disadvantaged regions lag behind. This divide is further exacerbated by Nigeria's linguistic and cultural diversity, where different school systems (e.g., Islamic schools in the north vs. secular or Christian-affiliated schools in the south) may have varying levels of digital adoption.

It is important to know that education in Nigeria is not divided along ethnic lines. None of the over 400 ethnic groups in Nigeria have established any formal education facility designed to cater to only members of such ethnic groups. Instead, what we have are schools and formal education facilities established or sponsored by private individuals, religious organisations, corporate institutions and government agencies.

Sweden benefits from a high level of cultural acceptance of technology, where digital innovations are widely embraced in education. This positive perception facilitates smoother integration of digital tools in classrooms. In contrast, Nigeria presents a more complex scenario due to its vast cultural and linguistic diversity. The country has distinct ethnic groups—such as the Hausa in the north (predominantly Muslim), the Yoruba in the southwest, and the Igbo in the southeast—each with varying levels of exposure to and acceptance of digital learning. While urban areas may show greater enthusiasm for digital education, rural regions often remain hesitant due to reliance on traditional teaching methods and limited access to modern technology (Ibrahim & Muhammad, 2024).

Strong leadership and coherent government policies are essential for successful digital transformation. In Sweden, educational leaders and policymakers work collaboratively to integrate technology into curricula, supported by consistent funding and clear regulatory frameworks. Nigerian schools, however, face challenges due to

inconsistent policy implementation, insufficient funding, and a lack of strategic direction from leadership (Baliyan & Khama, 2020). Additionally, Nigeria's federal structure means that educational policies may be applied unevenly across states, with wealthier regions (such as Lagos) having better digital infrastructure than less economically developed areas (Aderibigbe & Gumbo, 2024).

A critical factor differentiating Sweden and Nigeria is financial capacity. Sweden's strong economy allows for sustained investment in digital infrastructure, teacher training, and equitable resource distribution. Nigeria, despite having digital education policies, struggles with funding gaps, poor infrastructure, and significant regional disparities. Schools in more affluent or urbanized areas may have better access to technology, while those in rural or economically disadvantaged regions lag behind. This divide is further exacerbated by Nigeria's linguistic and cultural diversity, where different school systems (e.g., Islamic schools in the north vs. secular or Christian-affiliated schools in the south) may have varying levels of digital adoption.

Theme 2: Digital Infrastructure and Resources

Digital transformation in education becomes unachievable without enough infrastructure, which is the cornerstone of any effort at digital learning. This field explores the technical systems' dependability of educational institutions, the availability of digital resources, and the preparedness of the digital infrastructure. The move to online learning has been less difficult in nations like Sweden, whose internet system is really powerful. Since every student and instructor at Swedish institutions has access to modern technology tools and fast internet, digital education is a reality there. Modern digital technologies—which help students access a variety of learning environments and instructional resources—are mostly composed of computers, tablets, and software. Furthermore, consistent internet connectivity makes digital tools conveniently available both within and outside of the classroom (Aderibigbe and Gumbo, 2024).

Still, this is not the situation in many developing nations like Nigeria. One major obstacle still is the simplicity of getting digital resources and technologies. Certain

Nigerian schools impede digital learning by lacking resources such as computers, internet connectivity, and even power. Lack of resources means that neither teachers nor students can learn efficient applications of contemporary technologies. For pupils in low-income and rural areas, a digital gap brought on by uneven internet connection and inconsistent technical gadget availability is an even more severe issue. Although they sometimes struggle with questions of number, quality, and maintenance of these resources, urban schools do have access to technology. Outdated equipment, poor internet connection, or both might make it impossible for Nigerian schools to give their students access to high-quality digital learning alternatives (Ibrahim and Muhammad, 2024).

Digital infrastructure readiness is the degree of preparedness schools have to use and apply electronic resources; it is thus a particularly important element of this problem. A well defined infrastructure design guarantees the smooth integration of digital instruments into the Swedish educational system (Onyema et al., 2020). Apart from devices and internet connectivity, the smooth operation over time of the infrastructure depends on proper technical support and maintenance practices in place. Schools in Nigeria aren't always ready to welcome digital transformation, though, as infrastructure upgrades there aren't often well-planned or long-term orientated. Budget constraints, lack of technical knowledge, and inadequate infrastructure management make continual deployment and maintenance of digital tools and infrastructure difficult for educational institutions. Lack of technical support workers in Nigerian schools could cause prolonged outages and erratic access to online learning tools for students (Valencia-Arias, Chalela-Naffah and Bermúdez-Hernández, 2019).

Another important component of the digital infrastructure influencing classroom usage of technology is dependability. Sweden's high-quality infrastructure and established technical support system help to explain why technical system dependability is usually not a big concern there. Still, Nigeria's technology setup has a major dependability problem. Sometimes common problems like power outages, slow

connections, and antiquated technology cause disruptions to online learning. Although digital technologies offer great potential in the classroom, all of these issues make digital education less successful and irritate instructors and students even more, which is a pity.

Theme 3: Professional Development and Confidence

For digital transformation in education to succeed, teachers must be equipped with the necessary knowledge, skills, and confidence to effectively integrate technology into their classrooms. This theme explores teachers' familiarity with digital tools, their access to ongoing training, and the long-term sustainability of professional development programs. While Sweden has made significant progress in this area, Nigeria faces considerable challenges due to disparities in training opportunities, infrastructure, and policy support. In Sweden, teachers benefit from structured and continuous professional development, ensuring they remain proficient in digital teaching methods. Government policies mandate regular training, allowing educators to stay updated on technological advancements and innovative pedagogical approaches. Swedish teachers also have ample opportunities to collaborate, share best practices, and develop digital literacy, fostering a culture of tech-integrated education (Onyema et al., 2020).

In contrast, Nigerian teachers often lack consistent access to quality training, particularly in rural areas where resources are scarce. Even when professional development programs are available, many educators struggle to apply digital tools effectively due to insufficient hands-on training and technical support. This gap leads to reluctance in adopting technology, as teachers may feel unprepared or skeptical about its benefits (Aderibigbe & Gumbo, 2024). Additionally, Nigeria's diverse educational landscape—with variations between urban and rural schools, as well as differences across regions (such as the predominantly Islamic north and the more secular south)—further complicates uniform implementation of digital training initiatives.

Sweden's success in digital education stems from long-term, well-funded professional development initiatives that evolve alongside technological advancements.

These programs are not one-time workshops but part of a structured system that ensures teachers remain competent in using digital tools throughout their careers. Nigeria, however, struggles with the sustainability of teacher training due to inconsistent funding and poor coordination. Many programs are short-term or project-based, lacking the continuity needed to keep educators updated on emerging technologies. Without a structured, long-term approach, Nigerian teachers risk falling behind as digital tools rapidly advance (Olugbade, Oyelere, & Agbo, 2024).

Fundamentally, the Professional Development and Confidence theme is about arming teachers in Nigeria with the information, tools, and self-assurance they need to make wise decisions when including digital resources into their classrooms. This wide subject covers teachers' acquaintance with and competency with digital resources, their education and professional development over time, and their professional development going forward. Swedish teachers are prepared to incorporate technology into their lessons thanks in great part to intensive training and continuous professional development.

Chapter 5 Conclusion

Not least of all, studies on digital transformation in education—especially in Nigeria—show a complex terrain with plenty of room for improvement. Survey, regression, and descriptive statistical data highlight the challenges Nigeria has in fully embracing digital learning and provide remedies. Although this is not exclusive to Nigeria, by examining the country's particular difficulties and contrasting them with

those of technologically advanced countries like Sweden, officials, teachers, and IT developers might learn something.

The study came to the conclusion that among Nigeria's most urgent problems is a consistent internet infrastructure. With a mean score of fairly low at 2.86, the descriptive data revealed that many Nigerian schools lack the tools to use digital technology into their pedagogical systems. The lack of consistent internet access in the classroom together with antiquated computers and other technological gear restricts the possibilities of digital learning. This infrastructural gap limits the possibilities of digital transformation to enhance educational results since neither instructors nor students can make good use of digital learning platforms.

This infrastructure challenge is evident in various parts of the country albeit in varying proportions. While some parts are catching up in a consistent manner through continuous government interventions and private organisations investments, other parts still struggle to understand the need for digital learning and the adoption of digital learning tools for adequate education.

The major setback is not that of financial difficulty as much as the recognition of the need for adoption of digital education tools in order to equip and empower the students for the future. When the need has been recognised. The government and the private sector can create policies and make funds available to rightly equip the teachers for the task ahead including providing an adequately equipped digital learning infrastructure in the schools at various learning levels.

As shown by the rather low score for "Confidence in using digital tools," (mean = 3.07), the general ignorance and fear of technology is a major obstacle to the efficient use of digital tools in Nigeria's educational system. This lack of clarity leads to the rather low score of 2.98 for "Professional development support," which points to a broader structural issue with inadequate professional growth and training for teachers. Weak teacher training programs mean that children are not gaining from digital education as their teachers are not prepared to apply these technologies in the

classroom. Teachers need access to focused professional development initiatives if they are to succeed in a digital classroom. The fact that political unrest, corruption, and unequal application of policies can hinder the successful execution of educational reforms in Nigeria aggravates this situation.

Regression analysis helps one to better grasp issues with the sustainability of digital education in Nigeria. Though it was not statistically significant, the highest positive connection ($\beta = 0.158$) linked leadership support to imply that good political leadership might be very important in forward digital education. Results revealed that the sustainability of online education over time was not much influenced by "Government policy support" or "confidence in using digital tools". Real policy change—of which there has been quite little lately—requires better leadership all around. The results show that Nigerian legislators should give the execution of digital education reforms top priority nationwide.

Notwithstanding these obstacles, if Nigerian politicians and IT developers worked together, a window of opportunity for good change may open up. Legislators should endeavour to create laws allocating greater funds for the development of digital infrastructure so that educational institutions may maximise digital learning tools. For schools—especially those in rural areas—access to technology is very vital if we are to close the digital gap. Working with IT experts will help us design affordable digital platforms specifically for the local region that can operate even in places with unstable internet. These systems might incorporate offline features to ensure that students from all across the world, regardless of their location or degree of technological expertise, could take use of learning possibilities.

Higher-ups must provide critical support. The findings of the regression study reveal that the sustainability of online learning depends much on good leadership. Legislators in Nigeria may create and promote digital education laws fit for the particular needs of their nation by focussing on three areas: digital infrastructure, teacher professional development, and the manufacturing of digital tools. Should

government, educational institutions, and IT developers work together, we can design a system that allows every student, regardless of their technological aptitudes, access. A permanent online learning system in Nigeria would help instructors as well as pupils; this is a great beginning in that sense.

To be successful, nations like Sweden—which has effectively included digital learning into their educational systems—have depended on strong leadership, consistent policy execution, and a commitment to funding digital infrastructure. These nations have much to teach us about successful digital transformation, and they might alter Nigerian education. By including technology into their teacher preparation courses, we can guarantee that next generations of teachers will be digitally literate and at ease with a range of media platforms, drawing on the Swedish model. Nigeria has to support its digital infrastructure, enhance its teacher training initiatives, and pass laws ensuring that every kid has access to computers and can use them wisely if it is to catch up.

Though they present major challenges, these are not insurmountable ones for Nigeria. The poll data show that we can overcome obstacles in fields including digital infrastructure and teacher confidence. The secret is to move in the proper direction. Nigeria's huge and young population—which will make up a significant share of the world's workforce in the future decades—allows online learning to be an ideal match. Should Nigeria give digital education top priority and solve infrastructural, professional development, and policy implementation flaws, it can create a technologically competent and resilient education system capable of adjusting to next technology innovations.

If governments, educational institutions, and IT companies in Nigeria are committed to enable digital education and remove obstacles to it, they must cooperate. Nigeria may build a digital education system that is more equitable, accessible, and sustainable over time by funding infrastructure, educator professional development, and the evolution of flexible digital technology. A good shift to digital learning for every student in Nigeria depends on the collaboration of all the involved parties and political

leadership approval of the nation. Digital learning has the potential to become a necessary component of every Nigerian student's education without the appropriate investments, alliances, or leadership.

Considering the digital revolution of education in Nigeria and its remedies, one should recognise the limits of the study even if its conclusions are somewhat beneficial. The approach of the research, data collecting techniques, and any outside variables that could have affected the results define these restrictions. Accurate data assessments and the identification of regions that can profit from more study depend on a comprehension of these boundaries. Here we draw attention to issues with the sample size and diversity, data collecting techniques, geographical discrepancies, validity and reliability difficulties, and more general social and political backdrop.

Sample Size and Diversity

The somewhat homogeneous sample of this study is one of its main shortcomings. Notwithstanding the small sample size, the study was able to compile answers from a varied collection of people engaged in the Nigerian educational system: students, teachers, and stakeholders among other groups. Extrapolating the results from a restricted or homogeneous sample to the whole population is increasingly challenging. Biassed outcomes in the sample may have resulted from the over-representation of some areas, educational levels, or institution kinds.

Nigeria is so large and varied, hence the study most certainly overlooked some of the difficulties experienced by instructors and students in more isolated locations. The nation is split up into several regions with unique educational systems and degrees of internet access. Given the significant urban population of Nigeria, it makes sense that metropolitan places like Lagos and Abuja might offer a much different learning environment for instructors and students than rural locations. Urban teachers may view the difficulties their pupils experience differently than their rural counterparts as they have more access to knowledge and opportunity for professional development online.

The study used a small sample size, hence not all Nigerian legislators, LGU officials, or IT developers were questioned. This makes the results unlikely to be generalisable to the digital education system of the whole nation. Our poll under-represented these groups, which is concerning because they are vital for the direction of online learning. The digital revolution in Nigerian education offers both possibilities and problems; so, future research should aim for a more varied and representative sample of participants to sufficiently grasp these elements.

Data Collection Methods

Survey data presented a major restriction of the research even if it gave insightful quantitative analysis. Self-reporting bias is the phenomenon wherein respondents of surveys go towards their idealised notions of society instead of their actual experiences or opinions. The impacts on matters including government policy support, digital literacy, and the effectiveness of leadership could have been more complex. Responders could have overstated the success of present digital education projects as they were unwilling to openly question government policy or the calibre of teacher preparation.

Using a single poll as the only means of data collecting raises even another possible trap. Surveys give quick aggregate data; yet, qualitative techniques such as focus groups and in-depth interviews provide more insights. More qualitative study on the cultural and sociopolitical obstacles to online learning in Nigeria as well as on the experiences and challenges of teachers and students is also needed. By interviewing important players like government leaders, educational planners, and IT developers, one may have clarified the structural problems influencing digital education in Nigeria.

Moreover, the studies omitted longitudinal data that may have shown the change in digital education. The Nigerian government may have used longitudinal research to monitor the evolution of its online learning system and assess the effectiveness of remedial measures. The study presents a picture of digital education in its present state,

which might not be reflective of the future of policy and practice if one steps back to evaluate the larger background.

Regional Disparities and Socio-Economic Factors

Another main weakness of the study is its insufficient consideration of the geographical and socioeconomic elements influencing Nigeria's online learning environment. Distinct parts of Nigeria have somewhat distinct infrastructure, culture, and economy. These differences might greatly affect the quality and availability of online learning.

For instance, digital learning tools might provide extra challenges for instructors and pupils in northern Nigeria, where poverty is widespread and internet connectivity is scarce. Richer southern institutions, however, might have greater resources for modern conveniences such quicker internet, teacher preparation tools, and other amenities. This geographical gap might influence the results of online learning projects even if these elements might not have been totally taken into account in the research. The study might not fairly depict the possibilities and hazards that schools across Nigeria experience given their restricted geographic scope.

When deciding whether or not online learning is adopted, socioeconomic elements are equally as important as other ones. Many Nigerian students lack access to technology, which makes it challenging for them to participate completely in online learning initiatives. Another obstacle to digital learning for children from low-income homes is the great cost of cellphones, laptops, and unstable internet. Although the report did observe that Nigeria's infrastructure issues have socioeconomic origins, it abstained from discussing those reasons. Dealing with these social issues calls for a better knowledge of the interaction among poverty, technology availability, and education.

Reliability and Validity Concerns

Every research always raises questions regarding the legitimacy and dependability of the conclusions. The fact that the study depends on self-reported survey

data raises questions about its dependability because of worries regarding response consistency. Different or misinterpreted responses to the survey questions might skew the findings. Research applying statistical analytic approaches cannot ensure the correctness of subjective criteria including "confidence in using digital tools" and "leadership support" when it comes to evaluating them. Likert scales were used to quantify these features; they allow for interpretation biases and might not be able to capture the subtleties of the respondents' experiences.

The fact that the survey only used one instrument and that respondent answered on several facets of digital education aggravates issues concerning common method bias. Strong correlations between variables might arise from respondents' overall opinions on digital education instead of showing the links among the components under evaluation. Self-reported data does have limits even if numerous statistical techniques were applied to minimise these biases.

External Socio-Political Context

The conclusions of the study on the larger sociopolitical context in Nigeria carry a great drawback. Especially in the education sector, political unrest, corruption, and uneven application of laws in Nigeria have long been challenges to efficient government and policy execution. Research indicates that these extraneous elements have little impact on the success of digital learning projects. New educational programs might not be launched, investments in digital infrastructure might be postponed, or laws meant to support digital transformation might not be followed when governments are in chaos. Corrupt and politically unstable public sector leadership can produce ineffectual policies and poor utilisation of funding for digital education projects.

Although the survey did uncover some government support for digital education in Nigeria, long-term viability of this initiative depends much on the political and policy environment. With the government's track record of uneven policy implementation—education comes out on the bottom—possibly blocking significant spending in digital learning projects. Future research should look at how political unrest

and inadequate government influence the application of digital education initiatives in nations like Nigeria.

Although the study offers insightful analysis of the digital revolution of education in Nigeria, its limits should cause careful evaluation of its conclusions. Research constraints include a small sample size, lack of regional representation, dependence on self-reported data, and existence of more general sociopolitical elements—all of which could skew the findings. Future studies should aim to solve these constraints so that one may better grasp the advantages and drawbacks of online learning in Nigeria. Research on the manner in which political upheaval, economic inequity, and geographical isolation affect online education can help one to appreciate the challenges of this kind of learning in Nigeria and worldwide. This research might lead to more focused and successful solutions for these difficulties.

Recommendation for Future Research

The research highlights that some of the main problems with Nigeria's digital education scene include infrastructural flaws, inadequate government support, sociopolitical challenges, and poor teacher preparation. Nonetheless, given the results, there are some positive avenues digital education in Nigeria may follow. Based on these findings, the following suggestions are made to enable the educational digital transformation in Nigeria to reach both short-term and long-term goals.

Improving Digital Infrastructure and Access

According to the research, one of the most important challenges stopping digital learning from being used in Nigerian schools is insufficient digital infrastructure. The government and companies should give investments in digital infrastructure first priority. The proposal guarantees that every school has internet access and asks for modernising classroom equipment with the newest PCs, iPads, and interactive whiteboards. Schools in rural communities, where these resources are sometimes limited, will find this to be very critical.

Building a strong and dependable internet network that covers every part of the nation—including the most far-off villages and cities—should be among the most crucial goals of infrastructure development. Working with private internet service providers and telecoms firms to give schools in rural and undeveloped areas access to fast internet will help one to reach this aim. To buy these digital devices, the government may think about passing laws giving schools grants or incentives.

Not to mention that various regions of the country have varied technical environments; so, digital tools should be adaptable enough to fit various circumstances. Digital systems that let students access course materials and take tests even when the power goes out will help schools in remote locations or those with sporadic internet connectivity. Children in places without the internet may still have access to digital learning possibilities that their urban peers enjoy as these systems may be able to link with Internet resources.

Enhancing Teacher Training and Professional Development

The poll also brings attention to another major problem: instructors' and students' low degree of trust on using digital technologies. This microcosm represents the more general problem of pupils' poor utilisation of digital resources resulting from inadequate professional development initiatives and teacher training. The Nigerian government, educational institutions, and professional development groups have to finance comprehensive teacher training courses stressing digital literacy and the efficient use of technology in the classroom in order to solve this discrepancy.

Teacher preparation courses should seek to guarantee that teachers at all levels possess the required competencies to make good use of digital resources in the classroom. This covers giving instructors the information and tools they need to effectively use digital resources in the classroom—including how to design engaging courses and conduct online tests. Teacher preparation courses should mostly incorporate the technological and pedagogical features of online learning. This area covers

interactive online lesson development, meeting students' particular requirements in a digital context, and producing interesting online material.

Developing blended learning experiences combining online and in-person training helps to enhance initiatives aiming at preparing instructors. Teachers may study at their own speed using this approach and yet get instruction and comments from higher authorities. Professional development programs must be continuous if we are to guarantee that instructors are continually current on the newest instructional strategies, technology, and best practices in digital learning.

To ensure that every teacher is technologically literate, educators should be obliged to show mastery of this ability. This would help to direct the creation of initiatives aiming at teacher education. Government incentives meant for teachers to engage in digital literacy training courses can be pay bonuses or professional certifications.

Strengthening Government Policy Support

Though there is less support for government programs to improve digital education, the survey reveals that these policies are still being carried out either regularly or cohesively. The Nigerian government is in charge of establishing and executing a coherent strategy for the digital education system of the nation, therefore solving this problem.

The government should create a thorough plan for online learning including carefully stated goals, deadlines, and evaluation instruments. This approach should provide a stronger national digital infrastructure, greater opportunities for professional development of teachers, and access to digital learning materials. As the policy underlines, government agencies, educational institutions, businesses, and organisations should cooperate to sufficiently finance and carry out digital education projects.

Apart from a comprehensive national plan, the government should also give specialist bodies or task forces top priority for supervising the execution of digital

education policies and initiatives. These organisations might coordinate activities among federal, state, and local governments to guarantee fair and effective use of resources. The performance of online learning initiatives might also be tracked and assessed to enable changes to handle newly arising issues.

A sufficient funding mechanism for online learning initiatives should be one of the foundations of public policy. Given Nigeria's current financial situation, the government should look at additional financing sources such as public-private partnerships, foreign aid, grants from international bodies supporting education and technological advancement. Schools all throughout the nation should thus be able to efficiently embrace digital learning as long as the government has sufficient resources.

Encouraging Public-Private Partnerships

Apart from government-driven projects, public-private cooperation (PPPs) has great potential to enhance digital education in Nigeria. Given the findings of the study, one may reasonably expect Nigerian government officials and IT professionals to work together to satisfy the particular educational needs of the nation. Together, the Nigerian government and business sector—especially those in the IT and telecom sectors—should create reasonably flexible digital tools and platforms aiming at this objective.

Private sector companies might supply schools reasonably priced gear, software, and cloud-based systems to support projects on digital education. This will help teachers and institutions maximise technology in the classroom. Companies in Nigeria might create alliances with educational institutions to provide digital content fit for the national curriculum, therefore ensuring that students have access to first-rate learning resources.

Programs for teacher professional development and mentorship present another area where public-private collaborations could be successful. Universities and colleges that prepare classroom instructors for digital literacy initiatives might work with IT

firms and educational tech providers to develop and run these programs. Combining public and private sector knowledge and resources would let the digital education ecosystem of Nigeria flourish.

Addressing Socio-Economic Barriers to Digital Learning

This study highlights the persistent challenges that low-income students face in accessing digital education due to socioeconomic barriers. These challenges include limited access to the internet, lack of digital devices, and insufficient digital literacy within households. As digital learning becomes increasingly central to academic success, the digital divide threatens to widen existing educational inequalities unless immediate action is taken.

To address this issue, it is crucial for the government, educational institutions, and other key stakeholders to prioritise digital access for students from disadvantaged backgrounds. Providing close and consistent access to digital education for low-income students should be considered a national priority. One effective approach is the implementation of grants and subsidies targeted specifically at schools in low-income areas. These financial supports can be used to purchase computers, tablets, and educational software, as well as to fund internet access for students both at school and at home.

In addition, efforts should be made to make digital learning platforms more affordable and accessible. Partnerships with tech companies can lead to discounted or free subscriptions to online learning tools for schools that serve underprivileged communities. By removing financial barriers, students can more easily engage with interactive digital content that supports their academic development.

Collaboration between the government, community organisations, and non-governmental organisations (NGOs) is also essential in creating sustainable solutions. These partnerships can raise awareness about the importance of digital education while delivering support to families lacking digital infrastructure. For

instance, NGOs can help identify underserved communities and provide resources such as refurbished computers or discounted internet packages.

Community learning centres represent a particularly valuable initiative. These facilities offer shared access to essential technologies like computers, printers, and reliable internet connections. They also serve as safe and supportive environments where students can complete assignments, attend virtual classes, or receive tutoring. By making these centres widely available in low-income neighbourhoods, students can bridge the gap between their socioeconomic status and their educational opportunities.

Fostering Collaboration and Stakeholder Engagement

The conclusion of this study emphasises the critical role of stakeholder engagement in driving forward digital education in Nigeria. A sustainable and inclusive digital transformation in the education sector cannot be achieved by government action alone; rather, it requires the active participation of all stakeholders, including schools, parents, students, policymakers, business leaders, and civil society organisations. These groups must work collaboratively to ensure that digital education initiatives are fair, accessible, and responsive to the diverse needs of Nigeria's population.

Conferences, seminars, and multi-stakeholder forums should be regularly organised to provide a platform where various actors can come together to discuss common challenges, share best practices, and learn from one another's experiences. Such engagements promote transparency, build trust, and foster innovative approaches to overcoming the digital divide. Moreover, community involvement is vital. The government must include local communities in the decision-making process to ensure that parents, teachers, and students have a meaningful voice in shaping digital education policies and programmes. This inclusive approach enhances the relevance, acceptance, and effectiveness of proposed solutions.

As Nigeria's educational landscape continues to evolve technologically, a variety of opportunities and challenges will arise. To build a sustainable and equitable digital

education system, several key issues must be addressed. First, significant investments are needed to improve the country's digital infrastructure, including internet connectivity, electricity supply, and access to digital devices. Second, teachers must be adequately trained and supported to effectively integrate technology into their teaching methods. Without well-prepared educators, digital tools cannot be utilised to their full potential.

In addition, there must be strong policy frameworks and increased government support to guide and sustain digital education initiatives. Public-private partnerships should be encouraged to mobilise resources, develop innovative solutions, and scale up successful projects. Socioeconomic barriers—such as poverty, gender disparities, and regional inequalities—also need to be tackled to ensure that no child is left behind in the digital transition.

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Appendix

Interview Transcript 1

Participant: Secondary School Teacher (Public School, Lagos, Nigeria)

Interviewer: Thank you for your time today. Let's start with your confidence in using digital tools.

Q1: Confidence in Digital Tools

Interviewee: "I am confident in using the tools themselves—WhatsApp, Google Classroom, even creating simple videos. But my confidence is not in the technology; it is in the infrastructure. We often plan a digital lesson, only to find there is no power (electricity companies popularly known as NEPA has taken light) or the network data is too poor. My real skill has become how I quickly switch to a non-digital backup plan."

Q2: Student Engagement

Interviewee: "When it works, oh, it is fantastic. The students are very excited and curious to learn. Using educational videos on YouTube or simple PowerPoint presentations with pictures captures their attention completely. But their attention may not be sustained because, the moment the video buffers or a phone's battery dies, they lose focus. And for many of them, their only device is a parent's phone, which they must share."

Q3: Digital Infrastructure

Interviewee: (Laughs softly) "Infrastructure is our biggest challenge in this school and in many other government schools as well. Take for instance, here, we have a single projector for the whole school which has about 1000 students. The computer lab has 15 old desktop computers for a school of 1000. The internet router is in the principal's office. Students often use their mobile data, which is expensive. You cannot have 50 students in a class all streaming a video on their own data. It is not practical."

Q4: Professional Development

Interviewee: "We had a training session organized by an NGO last year on basic digital skills. It was very helpful, but it was only for two days. What we need is continuous training, especially on how to use low-data tools and how to integrate technology with our national curriculum. Most of what I know, I learned from my younger brother who is a programmer."

Q5: Leadership Support

Interviewee: "Our Principal understands the importance of adopting digital tools in this day and age and he continuously interacts with the government to see how this can be improved in the school. However, because it is a government school, where education is free, the budget for schools by government is very tight. Although, sometimes when I complain to him about the inability to deliver a lesson based on lack of data, he gives money out of his own pocket to support the students. Sometimes, he loads the prepaid meter to provide electricity specifically for some digital lesson classes. I am not sure if other principals in other schools do this but I think we are quite lucky with the kind of Principal that we have.

Q6: Cultural Attitudes

Interviewee: "Many parents see phones as a distraction, a luxury for talking and chatting, not for learning. They ask, 'Why does my child need a phone for school?' We have to educate them that it is a tool, not a toy. Some are convinced, but for others, it is a financial issue. They ask, 'You want me to buy data for school instead of food?'" and with the current economic situation in Nigeria, you really cannot blame the parents and it is also unrealistic that all the students will have smart phones and data to function.

Q7: Government Policies

Interviewee: "There are policies and beautiful proposals on paper about digital education. But the implementation is the problem. Sometimes the government will donate some tablets to a school for a press conference, but there is no provision for

internet, maintenance, or training on how to use them for teaching. It ends up as a photo opportunity, not a sustainable plan."

Closing:

Interviewee: "We are resilient and we make do with what we have. But we need stable electricity and affordable internet first. Without that, all the tablets in the world will not help achieve the aim. We need the foundation to be solid before we can build on it."

Interview Transcript 2

Participant: Rural Secondary School Teacher (Village in Kano State, Nigeria)

Interviewer: Thank you for speaking with me. Let's start with your confidence in using digital tools.

Q1: Confidence in Digital Tools

Interviewee: "My confidence is low, not because I cannot learn, but because there is little opportunity to practice. We use WhatsApp on my personal phone to send homework to the parents who have phones. But lack of power is so frequent that charging my phone is a daily struggle. You cannot rely on what isn't there."

Q2: Student Engagement

Interviewee: "When I show them a video on my small phone screen, their eyes light up. They once saw a video of a volcano erupting and they talked about it for weeks! But the engagement ends at the school gate. Most of these children have no light, let alone internet, at home. The video is a glimpse into another world that disappears as soon as I lock my phone."

Q3: Digital Infrastructure

Interviewee: "We have one laptop, given by a politician during a campaign. It is old and the battery is dead, so it must be plugged in—a problem when the generator has no fuel. The headteacher keeps it safe in his office. We have tried to use a mobile data stick, but the network is so weak and it comes and goes. It becomes completely unusable when it rains."

Q4: Professional Development

Interviewee: "An NGO from Lagos came and held a three-day digital workshop for the teachers. They taught us wonderful things about interactive apps and digital whiteboards. It opened our minds into another beautiful world and it also gave us a better understanding of the topics that we teach the students. The experience was really wonderful and we look forward to more of such.

Q5: Leadership Support

Interviewee: "Our Principal is really trying his best. He begs the local business owners for donations for fuel for the generator and buys data. Because we are in the northern part of Nigeria, we are still lagging behind in a lot of things and many parents are not really interested in educating their children but would prefer them to work on the farms. Our Principal periodically engages with the parents to convince them on the importance of education with emphasis on digital learning. Hence, some parents contribute when the Principal seeks their financial support.

Q6: Cultural Attitudes

Interviewee: "The elders in the village say, ‘Why do you need these screens? We learned with a slate and chalk, and so can they.’ There is a fear that it will change the children, make them disrespectful. So we have a compromise: we use technology only for special visuals and only when necessary in the lesson. The core teaching of reading and writing is done the traditional way."

Q7: Government Policies

Interviewee: "We hear about ‘Digital Nigeria’ on the radio. It has not reached us. Sometimes a government official will visit, see our condition, and promise things. But we are still waiting. Even if they brought a smartboard tomorrow, where would we plug it in? It would just become a very expensive blackboard."

Closing:

Interviewee: "They in the cities speak of artificial intelligence. We here need basic intelligence—the intelligence to start with the foundations: stable light, clean water, and enough books. Technology is a good tool, but it is not a miracle.

Interview Transcript 5

Participant: Secondary School Teacher (Village in Norrland, Sweden)

Interviewer: Thank you for your time. Let’s begin with your confidence in digital tools.

Q1: Confidence in Digital Tools

Interviewee: "I'm very confident. The municipality provides us with excellent tools and robust support. The challenge isn't the technology itself, but ensuring it serves our pedagogical goals in a remote area. We use digital tools for virtual field trips and to connect with experts in Stockholm, which bridges the distance."

Q2: Student Engagement

Interviewee: "It's crucial for us. For example, we use digital collaboration tools to partner with a school in Gothenburg on projects. It makes the world feel smaller and less isolated for our students. The only engagement issue is ensuring the activities are meaningful and not just ‘screen time.’ They can all revisit lessons at home as broadband is reliable even here."

Q3: Digital Infrastructure

Interviewee: "It's very good, a point of pride for the community. We have high-speed satellite internet provided through a municipal contract. Every student has a tablet provided by the commune. The infrastructure is so reliable we barely think about it, even in the heavy snowstorms. It just works."

Q4: Professional Development

Interviewee: "Our professional development is continuous and tailored. The training is less about how to use a specific app and more about how to use technology to support specific learning outcomes in a mixed-age classroom, which is common in rural schools. It's very practical and relevant."

Q5: Leadership Support

Interviewee: "Our headteacher is fantastic and a strong advocate. She successfully applied for extra municipal funding to upgrade our networking hardware, arguing that digital access is essential for equality in a remote region. The support is active, strategic, and effective."

Q6: Cultural Attitudes

Interviewee: "Parents are overwhelmingly supportive. They see digital fluency as a key skill for their children's future, whether they stay here and run the family business or move to a city. The discussion is about responsible use and balancing screen time with outdoor activities, which we strongly promote in our beautiful natural environment."

Q7: Government Policies

Interviewee: "National policies for digitalization in schools are clear and well-funded, and they trickle down effectively even to the smallest municipalities. The policy ensures equity, so a rural school like ours has the same standard of digital access as a school in a major city. It's about equal opportunity."

Closing:

Interviewee: "For us, technology is the ultimate tool for democratizing education. It ensures that our students in the north have the same opportunities and access to knowledge as any other child in Sweden. Our challenge is using it wisely to enhance our unique community strengths, not to replace them."

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Interview Transcript 3

Participant: Private STEM Teacher (Lagos, Nigeria)

Interviewer: Thank you for your time. Let's start with your confidence in using digital tools.

Q1: Confidence in Digital Tools

Interviewee: "I am very confident. Our school invests heavily in this area. We use platforms like Scratch and Python for coding, and we've even started using basic VR simulations for biology. However, we sometimes face challenges like power fluctuations that can interrupt a complex simulation, so we always have a backup plan."

Q2: Student Engagement

Interviewee: "The engagement is phenomenal. Using 3D printing to bring their CAD designs to life has revolutionized how they understand design and engineering. The downside I see is that some students begin to see the physical world as imperfect. If a hands-on chemistry experiment doesn't yield perfect results, like a simulation would, they get frustrated. They want the undo button of the digital world."

Q3: Digital Infrastructure

Interviewee: "It is excellent, but it comes at a cost. Each student has a school-issued tablet, and our labs are equipped with high-spec PCs. We have a dedicated, on-site IT team that handles everything from network issues to software licensing. This level of support is what makes everything else possible and is a key selling point for the parents."

Q4: Professional Development

Interviewee: "We have bi-monthly training sessions, often facilitated by vendors or external experts. The sessions are good, but they can be overly focused on the features of specific new products. What I and other teachers really need is more pedagogical training on how to integrate these tools to foster deeper problem-solving skills, not just how to use them."

Q5: Leadership Support

Interviewee: "The school management is fully behind our tech integration. They see it as a competitive advantage. The director actively promotes our STEM program and has funded student participation in national robotics competitions. The support is very much there, driven by both educational goals and market positioning."

Q6: Cultural Attitudes

Interviewee: "Parents are not just supportive; they demand it. They are paying a premium for a 21st-century education. The concern I have is that it creates a pressure to always use the latest tech, sometimes at the expense of foundational learning. I see students who can build a complex circuit in a simulator but struggle with the patience for meticulous soldering in a real lab."

Q7: Government Policies

Interviewee: "Government policies feel distant from our reality. While public schools struggle with basics, regulations like mandatory cyber-safety curricula are sensible. However, the national examination board is still firmly rooted in paper-based, rote-learning assessments. It creates a conflict where we teach critical thinking and project-based learning digitally, but students are tested on their ability to memorise and write by hand."

Closing:

Interviewee: "We are in a bubble of privilege here. Our challenge is to use this advantage responsibly. Technology is a powerful amplifier, but it must amplify critical thinking, not just replace it with flashy gadgets. We must ensure our students are thinkers and creators, not just consumers of technology."

Interview Transcript 4

Participant: Vocational Trainer (Technical Institute, Lagos, Nigeria)

Interviewer: Thank you for your time. Let's start with your confidence in using digital tools.

Q1: Confidence in Digital Tools

Interviewee: "I am very confident with the tools of my trade—I can use AutoCAD and other diagnostic software. But the institute's Learning Management System is slow and complicated. It's often easier to just use a WhatsApp group to share notes and assignments with the apprentices. It's more reliable."

Q2: Student Engagement

Interviewee: "When it works, it's brilliant. I downloaded an animation that shows how a gearbox works, and the students loved it. They could see what was happening inside. But the moment I switch to a PowerPoint to explain the theory behind it, they begin to struggle. They like the 'magic' of the animation, but struggle to understand the hard work of understanding the principles."

Q3: Digital Infrastructure

Interviewee: "It's a story of two worlds. We have a decent computer lab with a good internet connection, donated by a telecom company. But step into the practical workshop where the actual engines and generators are? No Wi-Fi. So I can't pull up a digital manual or a video tutorial on the spot where the work is happening. We have to go back to the lab, which sometimes breaks the flow and sometimes works out fine too."

Q4: Professional Development

Interviewee: "The best post-graduating training I ever got was from an automotive company that sponsored a workshop on their new engine software. That was practical and directly relevant. The training the institute provides is often too theoretical. They tell us to 'integrate technology' but don't show us how to do it when you have one computer for ten students."

Q5: Leadership Support

Interviewee: "The administration is good at getting flashy donations—a new CNC machine, a set of fancy diagnostic tools. It looks great in brochures. But then they find it difficult to approve the budget for the annual software license updates or for the specialised technician to maintain the machine. So these advanced tools often sit idle after the launch photo is taken."

Q6: Cultural Attitudes

Interviewee: "The master craftsmen who have been here for 30 years believe you learn with your hands, getting grease under your fingernails. They don’t believe in digital workflows, but overtime, we've found a middle ground. Though we still use the traditional paper manuals, I've started adding QR codes that link to video demonstrations. The older instructors tolerate it, and the students find it helpful."

Q7: Government Policies

Interviewee: "There is a big push to digitize the national apprenticeship records, which is good. It reduces the mountain of paper. But the online portal is difficult to use, requires a stable internet connection that we don't always have, and adds another layer of login hassles for students who just want to focus on welding or wiring. It feels like it was designed by someone who has never set foot in a workshop."

Closing:

Interviewee: "Technology is fantastic when it solves a real problem in the workshop. But too often, it's applied for its own sake, to look modern. The real skill is knowing when to use a digital diagnostic tool and when to use a simple screwdriver.

Interview Transcript 5

Participant: Special Education Teacher (Public School, Abuja, Nigeria)

Interviewer: Thank you for your time. Let's start with your confidence in using digital tools.

Q1: Confidence in Digital Tools

Interviewee: "I am confident in the tools I can access. Basic text-to-speech on a phone can feel like a miracle for a struggling reader. But my confidence is shaken by the lack of options. Most educational apps are not designed with dyslexia or autism in mind. They are too busy, too fast, with too many distractions. We make do with what we have."

Q2: Student Engagement

Interviewee: "When I find a simple, cause-and-effect app that responds to a single touch, it can captivate the attention of a non-verbal student and it gives them a voice.

However, the engagement could be interrupted if the device is old and the app lags, or if the screen is cracked, that moment of connection is lost. And for students with attention deficits, too many options on a screen can lead to information overload."

Q3: Digital Infrastructure

Interviewee: (Sighs) "We have two shared tablets for a class of 15 children with diverse needs. The batteries are weak. But the bigger problem is the peripherals. Headphones are always broken or missing. Without them, the classroom becomes a cacophony of different sounds from the tablets, which is sensory hell for many of my students. A simple pair of headphones is the difference between success and meltdown."

Q4: Professional Development

Interviewee: "I have learned almost everything from online SPED communities and free webinars from NGOs abroad. They are a lifeline. The training provided by the government is generic 'digital skills,' not the specific assistive technology training we desperately need. I need to know how to adapt a tablet for a child with cerebral palsy, not just how to use a PowerPoint."

Q5: Leadership Support

Interviewee: "The support is well-meaning but slow and limited by budget. It took me two years of pleading to get a single adaptive keyboard. They see it as a luxury for one child, not a necessary tool for learning. They are responsive to persistence, but they cannot give what they do not have. The will is there, but the funds are not."

Q6: Cultural Attitudes

Interviewee: "The biggest battle is against stigma. Many parents believe a child's disability is a spiritual issue, not a neurological one. They see technology as a frivolous toy or, worse, a 'coddle' that will make the child weak. We have to gently show them

how a communication app isn't giving a child a disadvantage; it's finally giving them a chance to participate."

Q7: Government Policies

Interviewee: "There are policies on paper about inclusive education, but they are not implemented. There is no enforcement for accessibility. The 'huge win' for us is any small step: convincing the school to use a larger font on handouts, or getting permission to use a free text-to-speech app. We are fighting for the bare minimum while the laws gather dust."

Closing:

Interviewee: "For us, technology isn't about being cutting-edge. It's about dignity. It's about finding the simplest, most affordable tool that can bridge a tiny gap for one child. True inclusion means designing tools and policies for our reality, not for a world with unlimited resources."

Interview Transcript 6

Participant: Special Education Teacher (Municipal School, Stockholm, Sweden)

Interviewer: Thank you for joining me. Let’s begin with your confidence in using digital tools.

Q1: Confidence in Digital Tools

Interviewee: "I'm extremely confident. We have access to a full suite of assistive technology (AT). From high-quality speech-to-text and advanced symbol-based communication software to eye-tracking devices for students with severe physical disabilities. The tools are not only available but are designed with universal design principles, meaning they work well for a wide range of learning differences."

Q2: Student Engagement

Interviewee: "Digital tools are transformative for engagement. We use interactive whiteboards for collaborative storytelling that allows non-verbal students to contribute using their devices. The technology allows for complete personalization. The challenge we monitor is sensory regulation; we carefully curate apps to avoid overstimulation and ensure tools are used to support specific communication and learning goals, not just for entertainment."

Q3: Digital Infrastructure

Interviewee: "It's comprehensive and reliable. Each student has access to a device tailored to their needs. We have a dedicated budget for peripherals: noise-cancelling headphones, adaptive switches, touchscreens, you name it. There's an AT specialist employed by the municipality who ensures everything is maintained and works together seamlessly."

Q4: Professional Development

Interviewee: "Our PD is ongoing and highly specialized. We have regular sessions with AT consultants and occupational therapists who train us on the pedagogical integration of specific tools. The focus is always on the student's individual educational plan (IEP). We also have a strong network for sharing best practices across schools."

Q5: Leadership Support

Interviewee: "The support is proactive and embedded in the system. The school leadership doesn't see assistive tech as an extra cost but as a fundamental right for students. Funding for new tools is built into the budget. My role is to identify the student's need, and the process for acquiring the right technology is smooth and efficient. It's a partnership."

Q6: Cultural Attitudes

Interviewee: "The prevailing attitude is that technology is essential for equity and participation. Parents are often advocates, pushing for the best tools to support their

child's learning. The conversation is about empowerment and autonomy. We work together with parents to show how a communication device doesn't replace human interaction; it enables it."

Q7: Government Policies

Interviewee: "Sweden's strong accessibility laws and the right to assistive technology are game-changers. This isn't a suggestion; it's a legal requirement. This policy framework forces continuous improvement and allocation of resources. It pushed all video content to have captioning and all learning platforms to meet strict accessibility standards, which benefits everyone."

Closing:

Interviewee: "Our philosophy is that technology should remove barriers to learning and social participation. The goal is to provide each student with the tools they need to express their thoughts and access the curriculum independently. Here, technology isn't a workaround; it's a cornerstone of an inclusive society, designed into the system from the very start."


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