

## Leveraging Digitalization in Nigerian Tertiary Education: Benefits and Challenges.

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### **Abstract**

*This paper examines the challenges and prospects of digitizing tertiary education in Nigeria, emphasizing the role of artificial intelligence (AI) and information and communication technologies (ICT) in transforming teaching, learning, and administrative operations. The study relies on secondary data obtained from reputable academic databases such as Elsevier, JSTOR, SAGE, and Springer, analyzed through a content analysis approach. Findings reveal that although digitalization offers numerous benefits including improved access to educational resources, flexible learning opportunities, enhanced instructional quality, and inclusive education its full implementation in Nigeria remains hindered by several challenges. These include inadequate funding for digital infrastructure, poor internet connectivity, unstable power supply, insufficient digital facilities, lack of skilled digital personnel, and resistance to technological change among lecturers and administrators. The paper concludes that effective digitization of Nigeria's higher education sector requires deliberate government investment in ICT infrastructure, regular digital literacy training for staff and students, and full enforcement of national ICT and digital education policies. Strengthening these areas will position Nigerian tertiary institutions to harness the transformative power of digitalization for sustainable national development.*

Key words: Artificial Intelligence (AI), Digitization, Tertiary Education

### **Introduction**

Tertiary education can be seen as a planned and structured educational system that uses teaching, research, and community service to further the overall development of people and the overall transformation of society. Post-basic and secondary school education that incorporates advanced teaching, research, and community service is another way to think of tertiary education.

(Ogunode, Edinoh, and Okolie, (2023). Tertiary education is a cutting-edge educational system designed to develop human capital via instruction, research, and volunteer work. Additionally, tertiary education is the third level of education and is intended to produce professionals with the skills necessary for technological and socioeconomic growth. (Ogunode, 2023).

One of the objectives of tertiary education in Nigeria, according to Ogunode et al. (2023), is to assist students in acquiring and developing the proper values that will enable them and their communities to survive; enhancing their intellectual capacities to comprehend and value the environment; acquiring both intellectual and physical skills that will enable them to become valuable members of the community; and gaining a general understanding of the local and external environments (FRN, 2013). Higher education institutions should work toward these objectives by teaching, research, sharing new and existing knowledge, serving the community, and serving as a repository of knowledge, according to the National Policy on Education (FRN, 2013). Higher education has been significantly impacted by digitalization and information and communication technologies, which are the foundation of its programs and activities worldwide (Bygstad et al., 2022). Classrooms and the way lecturers interact with their students have been impacted. The COVID-19 pandemic, which shut down schools nationwide in 2020, had sped up these changes. And in order to help close the gap, a lot of universities throughout the world have resorted to digital and technology-based education.

The National Policy on Education, the Digital Protocol Network on National Digital Policy, which was established by the World Economic Forum in conjunction with the 2030 Agenda for Sustainable Development of United Nations policies, and the National Policy on Information and Communication Technology (ICT) in School Education offer better opportunities for the deployment of technology and digital facilities for the acquisition of valuable knowledge and skills that will match the demand for labor market skills. Ensuring the complete digitization of Nigerian

higher education is the aim of ICT policy. Higher education is continuously being digitized, which could revolutionize how we instruct and study. Students and educators now have more ways to access and share knowledge thanks to digital technologies like multimedia resources, educational apps, and online learning platforms (Haleem et al. 2022).

By increasing the speed and efficiency of teaching, research, and community service, digitization has the potential to completely change the higher education system. Higher education digitization can improve flexibility, expand access to instruction, and raise the standard of higher education in Nigeria (Olanrewaju and Afolabi 2022). Despite the laws and programs intended to integrate higher education into digital education, Nigerian higher education digitization appears to be facing certain obstacles. This study aims to address the issues impeding the digitalization of higher education, as well as its advantages and potential solutions in Nigeria.

### **Objective**

The main objective of this paper is to explore the several issues impeding Nigeria's tertiary education system's digitization. Specifically, the paper will focus on the following;

1. The idea of Artificial Intelligence in context of digitalization of Tertiary education.
2. Benefits of Digitization in Tertiary Education.
3. Problems with Tertiary education digitalization in Nigeria.

### **Research Methodology**

This paper looks at the different issues that are preventing Nigerian higher education from becoming more digital. The idea of artificial intelligence in relation to higher education digitization, the advantages of digitization in higher education, and the challenges of digitalizing higher education in Nigeria were among the topics covered. Secondary data was employed in the study. The data was chosen using the content analysis method. The information was gathered from

published papers in respected worldwide publications, including but not limited to CEON, Elsevier, Hindawi, JSTOR, IEEE, Learn Techlib SAGE, Nebraska, and Springer.

### **Artificial Intelligence in Context of Digitalization of Education**

Copeland (2023) defines artificial intelligence (AI) as the capacity of a digital computer or computer-controlled robot to carry out actions often performed by intelligent entities. AI is commonly used in the process of creating systems that possess human-like cognitive functions, such as reasoning, meaning-finding, generalization, and experience-based learning (Ogunode et al., 2023). Dong et al. (2020) define artificial intelligence (AI) as the imitation of human intelligence. Additionally, artificial intelligence (AI) has grown in popularity recently across a number of industries, including education.. Consequently, artificial intelligence applications are being used in smart education to assist teaching staff, computerized assessment, and personalized learning in higher education. Consequently, AI teaching assistants help instructors save time responding to students' repetitious, easy inquiries in on-line discussion forums, thereby allowing instructors with more time to spend to higher-value work (Seo, et al, 2021; Goel and Polepeddi, 2018). As a result, they provide assistance that frequently leads to improved learning and lower costs. The field of Artificial intelligence resulted in the development of artefacts that demonstrate human-like intelligence replete with cognitive capacities, adaptability, and decision-making capabilities (Chassignol et al, 2018). These approaches have been widely adopted and used in education in a variety of forms. It's interesting to note that artificial intelligence in education began as computer-related technologies before gradually developing into online and web-based intelligence systems that perform duties and functions in compliance with commands (Oranga 2023). Artificial intelligence (AI) is being used to improve teaching, learning, and administrative procedures in education, which will ultimately lead to better results and more innovation in the sector.

## **Educational AI tools**

- ***Intelligent Tutoring Systems:*** AI algorithms are used by intelligent tutoring systems (ITS) to give learners individualized education and feedback. These systems, such as the well-known language-learning app Duolingo and the AI tutor Carnegie Learning, which helps students solve mathematical problems by offering detailed explanations, mimic one-on-one tutoring experiences by evaluating student knowledge, spotting misconceptions, and providing targeted interventions in real-time.
- ***Automated Grading and Feedback Tools:*** AI-based grading and feedback automate the grading process for assignments, quizzes, and exams. These tools use machine learning algorithms to analyze student responses, provide instant feedback / result, and detect plagiarism or academic misconduct.
- ***Educational Chatbots:*** AI-powered chatbots like ChatGPT serve as virtual assistants for students, educators, and administrators. These chatbots answer questions, provide support, and deliver personalized recommendations through natural language interactions via text or voice interfaces.
- ***Content Creation Tools:*** AI-based content creation tools like OpenAI's GPT-3 generate educational materials such as quizzes, study guides, and lesson plans automatically. These tools analyze input prompts and generate coherent, contextually relevant content to assist educators in curriculum development and instructional design.
- ***Plagiarism Detection Software:*** AI-driven plagiarism detection software like Turnitin and Copyscape use machine learning algorithms to compare students' submitted work against a database of academic sources and previously submitted documents. These tools identify instances of potential plagiarism and provide educators with evidence-based reports to uphold academic integrity standards.

## **Theoretical Framework**

### ***Technology Acceptance Model (TAM)***

The Technology Acceptance Model (TAM) provides a robust theoretical foundation for understanding the adoption and use of digital technologies in Nigerian tertiary education. Originally developed by Davis in 1989, TAM is rooted in the Theory of Reasoned Action and was specifically designed to explain users' acceptance of information systems. The model argues that an individual's decision to accept or reject a technology is not random but is shaped by key psychological and perceptual factors that influence attitudes and behavioral intentions toward technology use (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989)

At the core of TAM are two fundamental constructs: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which an individual believes that using a particular technology will enhance their job or task performance (Aulia & Marsasi 2024). This relates to the extent to which students and academic staff believe that digital tools such as learning management systems, virtual classrooms, online libraries, and digital assessment platforms improve teaching effectiveness, learning outcomes, research productivity, and administrative efficiency. According Singun (2025), when lecturers perceive that digitalization enables them to manage large classes more effectively, access up-to-date scholarly materials, or maintain academic activities during disruptions such as strikes or public health emergencies, their likelihood of embracing such technologies increases. Similarly, students who perceive that digital platforms improve access to course materials, facilitate flexible learning, and enhance academic performance are more inclined to adopt them (Singh et al. 2021)

Perceived ease of use, on the other hand, refers to the degree to which an individual believes that using a technology will require minimal effort (Gefen & Straub 2000). This construct is particularly significant in developing country such as Nigeria, where varying levels of digital

literacy, limited technical support, and inconsistent infrastructure can shape users' experiences with technology. If digital systems are perceived as complex, unreliable, or difficult to navigate, users may resist adoption regardless of their potential benefits (FakhrHosseini et al., 2024). According to Davis (1989), perceived ease of use not only directly influences technology acceptance but also indirectly affects perceived usefulness, as systems that are easier to use are more likely to be seen as beneficial.

Within Nigerian tertiary institutions, the relevance of perceived ease of use is evident in challenges such as inadequate ICT training for lecturers, limited exposure of students to advanced digital platforms, and poorly designed institutional systems (Dahiru 2025). Frequent power outages and unstable internet connectivity further complicate user experiences, reinforcing perceptions that digital tools are stressful rather than supportive. These conditions negatively affect attitudes toward digitalization, thereby weakening behavioral intention to use such technologies consistently.

TAM further posits that perceived usefulness and perceived ease of use jointly shape an individual's attitude toward using a technology, which subsequently influences behavioral intention and actual usage. Although later extensions of the model deemphasized attitude as a mediating variable, behavioral intention remains central to understanding technology adoption.

According to Agbatogun (2013), in Nigerian tertiary education, even when digital tools are officially introduced, actual usage depends on whether lecturers and students develop a strong intention to integrate them into their academic activities. Resistance to change, preference for traditional face-to-face teaching methods, and skepticism toward online assessment systems can all be interpreted through the TAM lens as outcomes of weak perceived usefulness or low perceived ease of use.

## **Benefits of Digitization in Higher Education**

Digitization in higher education brings about a multitude of benefits, transforming the traditional learning landscape. Because of digitization, fewer new buildings are needed, information sharing is improved, and collecting redundancy is decreased. Sorting, retrieving, and transmitting digital materials is rapid and easy. Additionally, when files are stored on an electronic device with the necessary capacities and equipment, accessing electronic information is less *expensive than its print version*.

1. **Access to Resources:** A vast array of educational resources, such as e-books, articles, films, and interactive simulations, are accessible through digital platforms. Because of this flexibility, students can investigate subjects from several angles and interact with the material in ways that best fit their preferred methods of learning. Digital platforms typically offer robust search functionalities and organizational features, making it easy for students to locate specific information within large repositories of content. This enhances efficiency and saves time that would otherwise be spent manually searching through physical materials.
2. **Transformation of Teaching and Learning Experience:** Digital technology adoption in higher education has the power to revolutionize instruction and learning. One of the key benefits of digitization is increased accessibility to education. For instance, students can access instructional resources from any location in the world through online learning systems. Students who are unable to attend conventional brick-and-mortar schools because of personal, financial, or geographic limitations may find this to be especially helpful. Students can study on their own time and at their own speed with online learning, which can also provide them more flexible learning options.

3. ***Customize Learning Experiences:*** The ability to adapt educational experiences to meet the needs of each individual is another advantage of digitization. With the help of digital technologies, students can have individualized learning experiences that let them concentrate on their areas of most need and push themselves in their strongest areas. For instance, educational applications can offer students personalized, dynamic, and captivating learning experiences based on their interests and needs. Apart from these advantages, digitization has the potential to improve educational quality. For instance, multimedia resources can give students access to a variety of educational tools, such as interactive simulations, podcasts, and movies. These resources can make learning more dynamic and interesting by helping to make difficult ideas come to life..
4. ***The advent of online Testing:*** Online testing has emerged alongside online education, which is quite advantageous for a variety of reasons. The most important of these considerations is the impartiality and perfect fairness of online testing. According to Khan et al. (2021), when a machine grades the test and automatically fixes incorrect answers, it is difficult to identify any bias. Additionally, online testing can be a fantastic substitute for those who suffer from test anxiety and find it distressing to take exams in front of others.
5. ***Improved Ability to Meet Special Needs:*** In the past, a rigid classroom structure defined the academic environment. Every student had the same experience, even if their needs and abilities varied. While some students might perform well in this environment, others had unfulfilled requirements. Thanks to technology, schools can better meet the requirements of a wide range of students. Today, students with hearing, speech, or vision impairments or those who are primarily housebound can still obtain an excellent education. Innovations in technology can also help students with intellectual, social, or developmental challenges.

Regardless of the unique demands of each student, technology facilitates the creation of inclusive learning environments, which enhances education.

Furthermore, according to Akinyemi et al. (2022), curricula that are taught in a digitalized setting enhance students' knowledge of media and technology, learning and innovation skills, and life and career skills. Cognitive abilities like creativity, problem solving, and critical thinking, on the other hand, are included in curriculum taught in non-digitized contexts since they may be taught and learned without the use of digital tools and surroundings. Therefore, learners have the opportunity to develop a cognitive resource-based mechanism and improve their skills, as well as to participate in lifetime learning and continuous education, thanks to the digitization of education (Abdullahi and Tijani, 2019). Additionally, expensive resources can be made more affordable in soft copies. Digitization connects students from different schools, even globally, in the discussion of academic-related matters, expanding the scope of many students' research. As a result of interconnected nations, the world is becoming a more global village, and digitization makes this possible.

### **Problems Militating Against Higher Education Digitalization in Nigeria**

There are several obstacles to Nigerian higher education's digitization. Some of these issues include inadequate funding for digital education, inadequate facilities, unstable power, poor internet coverage, high maintenance costs, a lack of digital personnel, low digital skills and knowledge among lecturers and students, resistance to change, and a lack of self-control. Listed below is an overview of each:

1. **Poor Funding of Digital Education:** The development of digital education in Nigerian higher education has been hindered by inadequate finance (Edewor et al. 2014). Nigeria's underfunding of higher education has an impact on all initiatives, including the sector's digitization program. According to Dada et al. (2022), there is a shortage of digital

facilities, equipment, and materials as a result of low funding and allocation for digital technology in higher education. In order to reduce the cost of running educational institutions, pay staff salaries and benefits, and buy teaching and learning resources like computers, labs, multimedia, and textbooks, among other things, funding is essential, according to Abdullah et al. (2017) and Akinyemi et al. (2022). The government's educational goals are vulnerable to issues with national mobilization and expenditure management since government spending on education is primarily reliant on federal account allocation (Okwuosa and Modibbo, 2021). Nigerian universities receive very little funding each year for management and administration, which has an impact on the growth of ICT and other infrastructure at different schools. For the non-academic personnel to work, many offices and departments in Nigerian institutions lack sufficient computers and computer systems. Before they can use the computer for office work, some non-academic staff members must wait for others to complete using it. Universities were unable to provide all the information technology required to meet the information needs of their faculty and staff due to a lack of funding (Ogunode, 2020).

2. ***Inadequate Digital Facilities:*** According to Ogunode et al. (2021), a lack of digital facilities prevents many higher education institutions from fully integrating with the nation's digitization initiatives. Higher education instructors, researchers, and students have been unable to fully utilize the resources for teaching, research, and academic activities in the various institutions due to the unavailability of these digital resources. Many higher education institutions in the country do not have enough computers, printers, fax machines, photocopiers, binders, projectors, and other equipment (Ogunode et al., 2021; Ohiwerei et al., 2013).

3. **Unstable Power Supply:** Numerous higher education institutions' digitalization initiatives have been impeded by the federation's inadequate power supply distribution. Nigeria currently has inadequate power generation and delivery. Numerous universities have been found to be situated in areas with inadequate electricity delivery and generation (Ogunode et al., 2021c). One of Africa's biggest problems, particularly in Nigeria, is the energy crisis. For example, according to Thisday (2022), although 8% of rural populations currently have access to electricity, West Africa has one of the lowest rates of electricity access in the world, with only roughly 42% of the population having it, and only three countries on track to provide access by 2030. Nigeria has the lowest access to electricity in the world, with over 92 million people without power, which is impeding the nation's industrial growth and creating other issues, according to the 2022 Energy Progress Report published by Tracking SDG 7. Nigeria's energy problem has affected the development of digital education generally, claim Ogunode et al. (2021). According to Akinyemi et al., the absence of dependable energy has also hindered Nigeria's attempts to digitize education. Ogbnuogwo et al. (2019) and Azuh and Melody (2014) claim that the lack of electricity has the effect of preventing Nigerian students from using information and computer technologies (ICT) effectively
4. **Poor Internet Coverage.** For Nigeria to achieve its digitization objectives, internet access is crucial. For digital education and the digitalization process to function, internet service is essential. Digital education is successful and efficient at educational institutions since internet services are readily available and reliable. It is regrettable that issues with internet accessibility and coverage persist in Nigeria. Bad internet connections are a common problem in Africa, especially in Nigeria. The digitalization of educational institutions has been impacted by the government's incapacity to provide a reliable internet connection

throughout Nigeria (Egielewa et al 2022). Many higher education institutions now have less options to use digital education services within their own institutions as a result of this issue. Idowu et al. (2023) found that because of inadequate internet service in certain higher education institutions, staff and students must move around the campus in order to access internet service and complete academic tasks. According to Ogunode and Jegede (2020), the digitalization initiative and growth of numerous higher education institutions in Nigeria have been hindered by inadequate internet connectivity. Nigeria's lack of access to technology has continued to be a major barrier, according to Ogune (2021), who also noted that the country's Internet penetration rate is 42.06 percent, despite the fact that the bulk of its population lives in rural areas.

5. **Poor Lecturers' Digital Skills:** Another issue with digital education in Nigerian higher education is digital illiteracy. Digital literacy is crucial for implementing digital facilities in classrooms; if lecturers who are expected to use these resources are not proficient in them, it becomes problematic and could prevent them from being used. According to Oyedokun et al. (2018), instructors' lack of digital skills and knowledge in Nigerian higher education has affected the development of digitization programs in various institutions. Furthermore, Idowu and Esere (2013) state that the average Nigerian university staff lacks computer literacy, which is disheartening in this modern digital age. Without a doubt, the majority of them have studied computer programs or taken basic computer training at some point. However, as practice makes perfect, computer training is useless without constant practice. Since practically all human activities rely on ICT in this era of ICT boom, computer illiteracy poses a serious threat to any establishment, let alone an educational institution (Anene et al., 2014). According to the findings of Ogunode (2020) and Idowu et al. (2017), a large number of academic staff members in Nigerian higher education

institutions lack computer literacy and ICT skills, which restricts their ability to use technology to provide academic services.

6. **Resistance to Change:** The industry participants' aversion to change presents another obstacle to Nigeria's educational institutions' digitization. Many important stakeholders in the nation's educational institutions are terrified of switching from outdated practices to more contemporary ones. This is typical of all human activities and life processes since individuals prefer to stick with what they know and do things the old-fashioned way rather than trying anything new. Nevertheless, it is difficult for any institution, whether it be a university or another type of business, to switch from outdated to contemporary methods. Large numbers of money, planning, time, disruptions, organizational changes, and, depending on the situation, staff reductions or additions make it challenging. The majority of university staff are in their mid-fifties, so they tend to avoid using modern technology, claiming that their age prevents them from having the time to learn the new generation's techniques (Idowu and Esere, 2013). Universities are not an exception to this long-standing practice.

## **Conclusion**

The advantages and drawbacks of Nigeria's higher education system's digitization were covered in this paper. According to the paper, the progress of digitalization in Nigerian higher education is hampered by a number of factors, including limited funding for digital education, inadequate facilities for digital learning, inconsistent electricity, poor internet coverage, lecturers' lack of digital skills and expertise, and reluctance to change.

## **Recommendations**

To address these problems, the paper suggests the following recommendations:

- i. An increase in higher education financing, with a special focus on the growth of digital education throughout all of the nation's higher education institutions.
- ii. All public tertiary institutions should have access to sufficient ICT resources from the government so that they can use them for classroom instruction and learning;
- iii. The government should ensure that educational institutions in the country especially the tertiary institutions are provided with constant / alternative power supply and good internet services.
- iv. More IT professionals should be employed in all the higher institutions to support the development of digital development.
- v. Government should organize constant training and retraining programme for students and lecturers and administrative staff to reduce the tension and fear of digital facilities;

The national policy on digital technology in all higher institutions should be well implemented beyond mere policy statements.

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