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### Research Article

## Teaching and Learning Process Transformation using New and Emerging IT Trends in the Nigerian Educational System

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### About Article

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### ABSTRACT

This study investigates how IT trends affect teaching and learning in the Nigerian educational system. It starts off with a summary of the current IT trends being used, such as the usage of technology in classrooms, accessibility to the internet, use of mobile devices and educational apps, and incorporation of virtual and augmented reality. The report then looks at how these IT trends have improved teaching and learning, including increased motivation and engagement, personalized learning experiences, easy access to a variety of learning resources, and chances for collaborative learning. However, there are obstacles to integrating IT trends into the Nigerian educational system, such as a lack of equipment and resources, a lack of digital literacy among teachers and students, reluctance to abandon the use of conventional teaching techniques, and privacy and security worries. The provision of professional development for teachers, the development of infrastructure and internet connectivity, the promotion of digital literacy, and addressing privacy and security issues are some of the strategies for successfully integrating IT trends in education. The study also provides examples of how IT trends have been successfully implemented in Nigerian schools, including the use of online tests, virtual and augmented reality in science instruction, and educational apps for individualized learning. Future directions and suggestions are then given, highlighting the necessity of increasing access to technology and internet connectivity, incorporating cutting-edge IT trends like artificial intelligence and machine learning, offering teachers ongoing professional development opportunities, and fostering collaboration between the government, educational institutions, and technology providers.

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## 1. INTRODUCTION

According to Ahmed and Yusuf (2019) the primary, secondary, and university educational systems in Nigeria are essential to the growth of the country. With the advent of Western education by Christian missionaries in the 19th century, it has changed over time (Ministry of Education Nigeria, 2020). In the modern educational system, basic school lasts six years, followed by junior secondary education for three years, senior secondary education for three years, and postsecondary education for three years. However, the system has a number of difficulties, including packed classrooms, poor infrastructure, a lack of instructional resources, and a shortage of competent teachers (Ahmed & Saidu, 2022). These elements have resulted in worse educational quality and fewer opportunity for pupils to realize their full potential.

The improvement of teaching and learning methods has become a top goal within the Nigerian educational system as a means of addressing these issues. The demands of a society that is changing rapidly cannot be satisfied by traditional teaching approaches, which frequently rely on rote learning and passive learning (Anthony *et al.*, 2017; Murphy *et al.*, 2011). Education should be a dynamic, participatory process that puts students at the centre and encourages creativity, critical thinking, and problem-solving abilities (Ahmed & Yusuf, 2019). The incorporation of new and developing information technology (IT) trends is a crucial facilitator of this shift. These trends cover a wide range of devices, programmes, and technologies that could completely alter the way that education is delivered (Tedla, 2012). Examples include the incorporation of virtual and augmented reality, the use of computers, tablets, and smartphones in the classroom, the availability of internet connectivity, the usage of educational apps and software, and more. These IT developments have several advantages for education, such as increased motivation, personalized learning experiences, accessibility to a wide range of educational resources, and potential for collaborative learning. Nigeria can develop a more efficient and equitable educational system that equips students for the possibilities and challenges of the future by accepting these reforms.

## 2. LITERATURE REVIEW

The teaching and learning processes in Nigerian classrooms have undergone a considerable transformation as a result of the integration of technology (Ogundele & Oyewusi, 2021; Ogundele & Ajayi, 2022). This includes enhancing the learning experience with the use of computers, interactive whiteboards, projectors, and other technological tools. This technology enables teachers to involve students in multimedia-rich lessons, enhancing the learning experience. Additionally, it makes it possible to use instructional software and programmes that are geared towards various academic disciplines and learning preferences, giving students access to a variety of data and resources (Abubakar & Ibrahim, 2021). A key factor in the change of the Nigerian educational system is internet connectivity. Students and teachers now have easier access to a wealth of information and learning resources, which enhances the educational process. A student's ability to connect with peers from other schools, take part in online discussions and debates, and interact in online

learning communities is made possible by having access to the internet (Salman, 2023). Teachers can share lesson ideas, access materials for professional development, and connect with colleagues around the world.

The way education is approached in Nigeria has changed as a result of the growing use of mobile devices like smartphones and tablets. There is a lot of promise for learning both inside and outside of the classroom with these lightweight, inexpensive gadgets. Educational applications have become important resources for improving educational possibilities and experiences (Dabeel, 2024). These apps offer interactive courses, tests, games, and simulations across a variety of topics and subjects. The educational system in Nigeria is likewise being transformed by virtual and augmented reality technologies. While augmented reality (AR) superimposes digital content on the actual world, virtual reality (VR) creates a simulated environment for students to explore and interact with (Luke & Kevin, 2021). Through the use of these technologies, students can interact and control virtual environments and objects, which encourages creativity and critical thinking.

## 3. METHODOLOGY

The teaching and learning process transformation employing new and emerging IT trends in the Nigerian educational system is being studied using a qualitative study technique. To understand more about the current processes, the qualitative component used research into previously published books, academic articles, and case studies from 2017 to 2022 (Figure 1). Recognizing the newest and most cutting-edge IT trends, such as the usage of mobile devices and educational apps, virtual and augmented reality integration, internet connectivity, and technology integration in classrooms. to examine statistical patterns and trends associated with IT trends. The impact of these IT trends on the teaching and learning processes in the Nigerian educational system is examined in this study. There are numerous methods available.

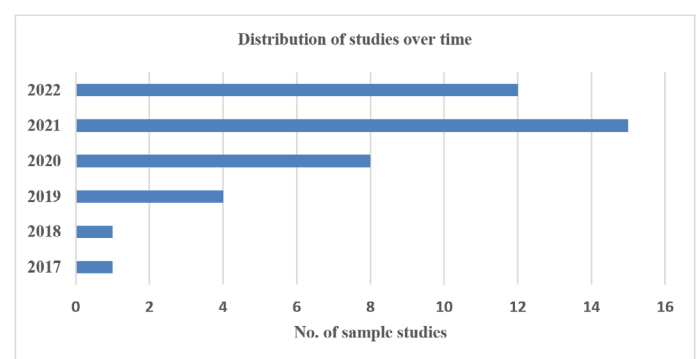


Figure 1. Distribution of sample studies over time

### 3.1. Ethical Considerations

In order to provide sufficient information relevant to this study, the researchers made sure that prior studies in the form of papers or conference proceedings, books, and book chapters content were taken into consideration for the review based on the titles, abstracts, keywords, and primary contents. Additionally, all of the sources used for this study were acknowledged in compliance with research ethics.



## 4. RESULTS AND DISCUSSION

### 4.1. Impacts of IT Trends on Teaching and Learning Processes

Students in Nigeria are now more engaged and motivated as a result of the adoption of IT trends in the educational system. Technology has the power to hold kids' interest and make learning more engaging and fun (Ogundele & Ajayi, 2022; Ajayi & Ogunbodede, 2020). With the use of multimedia components like movies, animations, and interactive simulations, abstract ideas can be made more concrete and approachable. Technology also makes it possible for students to have personalized learning experiences where they can study at their own speed and investigate subjects that interest them. As a result of feeling more invested in their education, students become more engaged in the learning process. The use of gamification tools like leaderboards, medals, and awards encourages students to reach predetermined milestones and goals, which also raises motivation levels (Okoro & Adeyemi, 2022). The Nigerian school system now offers personalized learning opportunities because to IT trends (Abubakar & Ibrahim, 2021). Technology enables adaptive learning platforms that can evaluate student performance and offer specialised resources and information to meet each student's needs. Based on their skills and shortcomings, students can receive customized feedback, suggestions, and more practice exercises. Additionally, personalized learning environments accommodate various learning preferences and styles (Adewale & Afolabi, 2022). Students who have access to a variety of digital materials can pick the format and medium that best fits their learning preferences. Videos and infographics are useful for visual learners, while podcasts and recorded lectures are useful for auditory learners. This adaptability makes sure that students may interact with the material in a way that speaks to them, which improves understanding and retention.

**Table 1.** IT Trends in Education

IT Trends	Description	Source
Artificial Intelligence (AI)	This includes deep, reinforcement, and IoT for AI related technologies	(Bello & Ibrahim, 2020)
Cloud Computing (CC)		(Ogunleye & Adekunle, 2021)
Mobile Learning	This includes blended, online, e-learning system.	(Olatunde & Adekunle, 2022)
Gamification & Chatbot (Chat GPT)		(Okoro & Adeyemi, 2022; Oladapo & Afolabi, 2022)
Social Media Learning (Web 2.0)		(Abdullahi & Oladele, 2021; Ajayi & Ogunbodede, 2022)
Augmented & Virtual Reality (AR/VR)	This comprises augmented and virtual reality	(Okonkwo & Nwosu, 2021; Adeyemi & Ahmed, 2019)

The use of international textbooks, articles, and videos by students and professors has greatly helped the Nigerian educational system as a result of IT developments. Due to the democratization of education, all students have the same chances to access educational resources and follow their academic interests (Sutton & Barto, 2018; LeCun & Hinton, 2015). Collaboration among students on projects is now possible regardless of where they are physically located thanks to IT developments. Online platforms provide real-time collaboration, file sharing, and communication, removing obstacles and allowing students to pick up knowledge from their peers (Okeke & Nwosu, 2021; NITDA, 2022). Teamwork, communication, and problem-solving abilities are fostered by collaborative learning, which are vital in today's environment. Additionally, thanks to technology, students from various institutions or nations can connect and work together on projects and conversations. This cross-cultural interchange of ideas and viewpoints improves the educational process and equips pupils for living in a globally connected environment (Olatunde & Adebayo, 2021). Federal Ministry of Education, Nigeria, (2021) states that the wide-ranging effects of IT trends on teaching and learning practices in the Nigerian educational system include increased motivation, engagement, individualized learning experiences, accessibility to a variety of educational resources, and opportunities for collaborative learning. Teachers can build a dynamic, inclusive, and productive learning environment that equips students for success in the digital age by embracing and utilising these IT trends.

### 4.2. Challenges in Implementing IT Trends in the Nigerian Educational System

Incorporating IT trends into the Nigerian educational system is difficult for a number of reasons. These include a lack of digital literacy among teachers and pupils, limited infrastructure and resources, opposition to changing from traditional teaching techniques, and privacy and security issues (Okonkwo & Nwosu, 2021). The efficient integration of IT tools and platforms into teaching and learning processes is hampered by a lack of infrastructure and resources. Schools frequently lack computers, dependable internet connectivity, and other essential equipment, which can be costly for many institutions, particularly in rural or underdeveloped areas (Ogunleye & Adekunle, 2020; Goldberg, 2017). The digital divide makes educational disparities worse since pupils in schools with good technology have a clear advantage over their less fortunate peers.

Additionally, both teachers and students struggle with digital literacy. Because there are not enough opportunities for training and professional development, many teachers may not have the knowledge and abilities to successfully use technology into their teaching methods (Szeliski, 2010). Without the right teaching and assistance, teachers might find it difficult to use and understand IT platforms and tools, which would make it more difficult for them to conduct effective technology-based instruction (Ogunleye & Adekunle, 2021). Furthermore, students might not have the digital literacy and abilities they need to use technology effectively in the classroom. Due to this gap, students may find it difficult to use digital resources,



analyse online sources, or collaborate with one another in an efficient manner in the classroom.

Another key obstacle is the resistance to departing from the conventional teaching strategies. Traditional methods, including lectures, textbooks, and rote memorization, have long been a mainstay of educational systems and instructional techniques. Teachers, administrators, and parents could be reluctant to adopt new IT trends since they call for a change in pedagogical practices and mindset (Ogunleye & Adebawale, 2021; Szeliski, 2010). Comprehensive training, support, and a clear explanation of the advantages that IT trends can offer to the teaching and learning processes are necessary to overcome this opposition. The employment of technology in the Nigerian educational system is also hampered by privacy and security issues (Okafor & Adeleke, 2020). The need to address concerns relating to data privacy, protection, and cybersecurity has arisen as a result of the growing reliance on digital platforms and data collection. Schools must make sure that student information is securely stored and that the necessary safeguards are in place to prevent abuse or unauthorized access.

#### 4.3. Strategies for Successful Integration of IT Trends in Education

For students to have a good learning experience in the digital age, IT trends in education must be integrated. Four techniques must be put into place in order to do this: offering teachers professional development, creating infrastructure and guaranteeing internet connectivity, encouraging digital literacy among teachers and pupils, and resolving privacy and security issues. Teaching teachers how to use various IT tools, applications, and software to improve student learning should be a main focus of professional development programmes (Sutton & Barto, 2018). Strong infrastructure should offer dependable internet connectivity, ample bandwidth, and resources for the most recent technology and applications (Adeyemo & Ahmed, 2020). Teachers and students may have trouble using educational technology tools, collaborating on projects, and accessing online materials without a reliable and quick internet connection. Promoting digital literacy requires not only technical know-how but also the capacity to find, assess, and utilize digital resources and information (Ogundele & Ajayi, 2022; Ibrahim & Bello, 2020). The critical evaluation and analysis of online content, appropriate online conduct, and the use of digital tools for study, communication, and creative expression should all be taught to teachers and students.

It is crucial to address privacy and security issues as technology usage in schools increases. To protect student privacy and maintain the security of sensitive data, schools must adopt policies and procedures. This entails putting safeguards in place to protect student data, delivering training on data privacy and security, and adhering to all applicable rules and regulations (NCCE, 2022). In a nutshell incorporating IT trends in education necessitates a multifaceted strategy that involves offering professional development for teachers, setting up infrastructure and internet access, fostering digital literacy, and attending to privacy and security issues.

#### 4.4. Case Studies: Successful Implementation of IT Trends in Nigerian Schools

Nigeria, like many other countries, has recognized the importance of integrating IT trends in education to enhance student learning and prepare for the digital age. Several schools in Nigeria have successfully implemented IT trends, and here are three case studies showcasing their achievements:

##### School A: Virtual classrooms and online assessments

School A, located in Nigeria, successfully implemented online tests and virtual classrooms to improve the learning environment for its students. The school has developed a virtual classroom environment where students can participate in live online classes, communicate with their instructors, and work together with their classmates by utilising video conferencing platforms and learning management systems. This strategy has made it possible for students to obtain high-quality education remotely, particularly in emergency situations or when physical attendance is not feasible. Online examinations have also been established at School A, allowing students to complete exams and quizzes electronically, offering immediate feedback, and lessening the workload associated with manual marking. It has been demonstrated that combining online tests with virtual classes can effectively maintain educational continuity and increase student engagement.

##### School B: Use of educational apps for personalized learning

School B in Nigeria has embraced the use of educational applications to customize the children's educational experiences. Teachers at School B can adapt the curriculum to each student's unique needs and interests by utilizing technology. Learning at their own pace and delving further into areas of interest are made possible by educational applications' dynamic and interesting information, which is tailored to different learning styles. These apps also give users the chance to receive rapid feedback, enabling users to monitor their development and spot areas in need of development. Since the use of educational apps, School B has reported higher academic performance and greater student motivation, proving the value of personalized learning through technology.

##### School C: Integration of virtual and augmented reality in science education

Virtual and augmented reality (VR/AR) technologies have been successfully incorporated into science education at School C. Students at School C can explore and interact with virtual objects and environments utilising VR/AR hardware and software, which helps them better understand challenging scientific ideas (Okonkwo & Nwosu, 2021). For instance, students can virtually examine the solar system, dissect a frog, or investigate the human body in three dimensions. Students gain a deeper understanding of scientific ideas via this immersive learning experience, which also develops their curiosity and critical thinking abilities. Since integrating VR and AR into the classroom, School C has noticed an increase in student engagement and excitement for science.



These case studies show how IT trends have been successfully incorporated into schools in Nigeria. These schools have boosted student engagement, academic achievement, and digital readiness by utilising virtual classrooms, educational apps for personalized learning, and VR/AR in science instruction (Ugwu & Eze, 2022). Other educational institutions wanting to successfully integrate IT trends can find inspiration and useful information from these examples.

In order to improve teaching and learning procedures, this research article examines the idea of digital transformation in Nigerian education. It goes over the advantages, difficulties, and tactics for successfully integrating IT trends into the Nigerian educational system. The effect of artificial intelligence (AI) technologies, such as intelligent tutoring systems and chatbots, on teaching and learning in Nigerian schools is investigated (Bello & Ibrahim, 2020). These technologies personalise learning experiences, increase student engagement, and improve educational outcomes. The use of internet access to extend educational opportunities, promote cooperation, and give students and teachers access to a variety of knowledge is also covered under the section on leveraging connectivity for learning. The potential for immersive learning experiences, improving student comprehension and retention, and preparing students for real-world applications in their respective professions are all examined in this analysis of virtual reality (VR). The use of mobile devices to facilitate anytime, anywhere learning, encourage student participation, and provide access to educational resources in remote places is investigated in this study of mobile learning in Nigerian primary schools (Adeyemi & Ahmed, 2021). Gamified learning environments improve student motivation, engagement, and accomplishment by integrating game dynamics into educational activities, which is a topic that is covered in this article about gamification in Nigerian education (Okoro & Adeyemi, 2022; Oladapo & Afolabi, 2022). The collection, analysis, and interpretation of educational data offer important insights into student learning and instructional effectiveness, resulting in personalized and data-driven teaching and learning experiences. Learning analytics are also explored. The use of cloud-based technologies in Nigerian schools is examined, along with the benefits and drawbacks of doing so, as well as blockchain technology's potential for secure credentialing.

The use of augmented reality (AR) in science instruction in Nigeria is being investigated. AR offers students dynamic, immersive learning experiences that help them visualize difficult scientific ideas and encourage a deeper comprehension and retention of scientific knowledge. The potential uses of artificial intelligence (AI) in enabling adaptable and customized learning experiences are highlighted (Bello & Ibrahim, 2020). The advantages, difficulties, and pedagogical ramifications of integrating mobile devices and applications into teaching and learning processes are examined in a systematic review of mobile learning in higher education (Olatunde & Adekunle, 2022). The topic of virtual reality (VR) is reviewed along with its potential educational advantages, difficulties, and integration into educational contexts. The use of data-driven decision making (DDDM) in curriculum development, instructional practices, and student support is also examined. Finally, the prospective

applications of wearable technology and the Internet of Things (IoT) in education are explored. These technologies have the potential to improve teaching and learning processes while also offering problems and implementation-related considerations.

## 5. CONCLUSIONS

To adequately prepare pupils for the digital age, Nigeria must change its educational system. This change calls for the adoption of IT trends in the educational system, which have the potential to modify how knowledge is transmitted and acquired. Rapid technological improvements have rendered traditional approaches obsolete, thus it is crucial to modify these procedures to fit changing student needs and give them the skills they need. Nigerian schools can develop dynamic learning environments that promote critical thinking, creativity, and problem-solving abilities by embracing IT trends. By enabling personalized learning experiences, granting access to a wealth of information, and promoting collaboration between students and teachers, IT trends like artificial intelligence, machine learning, and internet connectivity have the potential to completely transform the Nigerian educational system (Bello & Ibrahim, 2020). Nigerian schools can increase student engagement, improve learning results, and close the knowledge gap between classroom instruction and real-world skills by integrating these technologies into the curriculum. All interested parties must accept and promote the integration of IT trends in education if those benefits are to be fully realized. Parents should support the use of technology in education, educational institutions should prioritize teacher training and professional development, and technology providers should work with schools to provide cutting-edge tools and solutions. These actions will help schools adopt technology. Through this collaboration, an environment that supports the seamless integration of technology into education may be created, ensuring that Nigerian students have the knowledge and abilities required to succeed in the digital age.

Nigeria is adopting IT trends in education, but it is critical to take into account potential directions and suggestions to improve the adoption and efficiency of these technologies. It is crucial to increase access to technology and internet connectivity, giving schools enough resources like computers, tablets, and dependable internet connections. This will ensure that all children have equal chances. By bringing connectivity to rural areas and underserved groups, efforts should also be made to close the digital divide. In order for Nigerian schools to remain at the forefront of IT trends, it is essential that emerging technologies like AI and machine learning (ML) be incorporated into the curriculum. By delivering personalized learning experiences, automating administrative processes, and enabling intelligent tutoring systems, these technologies have the potential to revolutionize education. Schools may improve student engagement and learning results by embracing these tools, preparing students for the quickly changing digital context.

Opportunities for teachers' ongoing professional development are also crucial for successfully incorporating IT trends in education. To improve their digital literacy skills and incorporate technology into their teaching methods, teachers



should receive training and support. Workshops, seminars, and online courses that concentrate on the efficient use of IT technologies and techniques in the classroom might be included in professional development programmes. For Nigerian schools to have a successful IT ecosystem, cooperation between the government, educational institutions, and technology vendors is crucial. Governments should establish policies and set aside funding to encourage the adoption of IT trends in education, and educational institutions should actively pursue collaborations with technology companies to gain access to the most recent equipment and innovations.

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