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Project Initiatives on Inclusive and Equitable Use of Artificial Intelligence in Education: Lessons Derivable for Policy Direction in Nigeria

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Abstract

This paper reviewed some project initiatives on inclusive and equitable use of artificial intelligence (AI) in education with a view of guiding education policy-makers and stakeholders in the development of similar project initiatives in Nigeria. The gap in extant literature on policy direction for the development of inclusive and equitable use of AI in education in Nigeria necessitated the paper. It began with a discussion of the general overview of AI and the unprecedented revolution it has created in the education delivery. It further discussed the advantages of the AI application in education as well as the challenges and controversies associated with it particularly the generative AI (GenAI) systems which are rapidly spreading in the education sector. It also discussed UNESCO's recommendations of the appropriate use of GenAI in education to genuinely benefit and empower teachers, learners and researchers. It advocated the necessity of Nigerian government to develop a policy framework for the responsible use of GenAI in education and research. Most importantly, the paper identified some large-scale project initiatives on inclusive and equitable use of AI in education and discussed the lessons derivable from the project initiatives for policy direction in the development of similar projects in Nigeria. The paper recommended, among others, special funding on the development of inclusive and equitable AI apps in the education budgetary allocation and private sector partnership/collaboration in funding in the development of such AI apps.

INTRODUCTION

Artificial intelligence (AI), along with Robotics, Web3, Blockchain, Cloud computing, Quantum computing, Internet of Things (IoT), 3D Printing, Virtual Reality (VR), Augmented Reality, and Biotechnology, is one of the most advanced technologies of the fourth industrial revolution (4IR) and is widely used in human activities. AI is revolutionising, re-engineering, and transforming all human activities through automation, including efficient production of goods and services, organisational activities, decision-making, productivity, and technical and professional competence and knowledge.

AI is also the most educational technology. Understanding the relevance of AI in education, UNESCO held two international conferences on AI in education in 2019. The first conference, "Artificial Intelligence for Sustainable Development," examined the pros and cons of using AI in education. Over 40 AI initiatives presented and evaluated learnings from national policies and strategies that used AI to achieve SDG 4 (UNESCO, 2019). The second UNESCO conference, "Artificial Intelligence and Education: Planning Education in the AI Era: Lead and Leap," promoted global collaboration and alliances to support the egalitarian, inclusive, and open use of AI in education and allowed participants to discuss the latest AI advances and how they affected teaching and learning. The conference generated the "Beijing Consensus on Artificial Intelligence and Education," a call to action for UNESCO Member States to integrate and apply AI in education. In this backdrop, this study examined artificial intelligence (AI) in education and vividly described various large-scale AI-leveraged project endeavours to improve education and learning. The description and discussion of these project initiatives aimed to bring education policymakers and stakeholders' attention to them and their significant takeaways for future AI-leveraged education project initiatives.

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The Emergence and Advantages of the application of AI in Education

The field of artificial intelligence (AI) was founded as an academic discipline at a workshop held on the campus of Dartmouth College, USA during the summer of 1956 and the attendees, who subsequently became the leaders of AI research for decades, predicted that a machine as intelligent as a human being would exist in no more than a generation (Moor, 2006). Artificial intelligence (AI) describes computers that can 'think' like humans and can recognise complex patterns, process information, draw conclusions, and make recommendations (Zhang, Zhang, & Li, 2019). For a given set of human-defined objectives, AI can make predictions, recommendations or decisions influencing real or virtual environments (Vincent-Lancrin & van der Vlies, 2020). They can perform many tasks that require human intelligence (Rossi, 2019). In other words, AI is a commonly used term to describe machines performing human-like cognitive functions like learning, understanding, reasoning, and interacting (Baruffaldi et al, 2020).

Vincent-Lancrin and van der Vlies (2020) classified the types or dimensions of AI into seven categories: (1) Artificial Narrow Intelligence – This refers to AI designed to complete specific actions and it is unable to independently learn. (2) Artificial General Intelligence – This refers to AI designed to learn, think and perform at similar levels to humans. (3) Artificial Superintelligence – This refers to AI which is able to surpass the knowledge and capabilities of humans. (4) Reactive Machines – This refers to AI capable of responding to external stimuli in real time but unable to build memory or store information for future. (5) Limited Memory AI – This refers to AI that can store knowledge and use it to learn and train for future tasks. (6) Theory of Mind AI – This refers to AI that can sense and respond to human emotions and perform the task of limited memory machines. (7) Self- Aware AI – This refers to AI that can recognize other's emotions and has sense of self and human intelligence. Wing (2020) confirmed the rapid deployment of systems using artificial intelligence in critical domains such as autonomous vehicles, criminal justice, health care, hiring, housing, human resource management, education, law enforcement, and public safety where decisions taken by AI agents directly impact human lives.

Artificial Intelligence in Education

Globally, AI has become the new trend of technology in the education sector and competitively changing learning environment (Commonwealth of Learning [CoL], 2023). Artificial intelligence (AI) in education refers to the use of computers that mimic human perception and decision making to complete a task in the classroom and management of the class as well as the course load (Thompson, 2022). The goal of AI in education is to improve students and offload administrative tasks that take up teacher time. According to UNESCO (2021), '' artificial intelligence has the potential to address some of the biggest challenges in education today, innovate teaching and learning practices, and ultimately accelerate the progress towards SDG 4".

UNESCO (2019) documented the advantages of the application of AI in education as follows: (1) Artificial Intelligence (AI) systems can transformed classrooms by allowing students from any country to access education, regardless of their preferred language of instruction or any potential visual or auditory limitations. (2) Learners can get real-time subtitles for all the teacher's instructions and lectures with AI-powered tools like Presentation Translator. (3) Additionally, AI makes it possible for personalised learning which adapts the educational process to each student's unique interests and history. (4) AI makes sure that students have the most efficient and customised learning experience by adapting to their level of expertise, rate of learning, and desired goals. (5) AI software can also reduce costs by streamlining the course development process and producing interactive content more quickly. As a result, teachers are better able to address any area where students may be having difficulty.

In a follow-up view to the above, Liu & Huang, (2021) also listed the importance of using AI for education thus: (1) AI helps teachers spot gaps in lectures and educational materials. (2) It also provides customised messages with tips for the right response to teachers when students submit erroneous responses to homework assignments. (3) AI is also useful for automating non-teaching tasks including attendance monitoring, organising teaching resources, grading assignments, handling paperwork, creating progress reports, and maintaining teaching materials at lower educational institutions (primary and secondary schools). (4) Teachers can spend less time on non-teaching duties which frequently take up a large portion of their time through the automation of these duties with AI and spend more time imparting crucial competencies to students. (5) AI in education can assist students with tutoring using Chatbots and AI tutors, especially in disciplines that may be taught successfully online when teachers are not present. AI also makes it easier to create intelligent material, such as online manuals, textbooks, movies, and other educational devices. (6) The creation of web-based classes and AR/VR-based learning environments can help educational institutions benefit from AI.

Challenges and Controversies Associated with the Application of AI in Education

Despite its benefits, AI in education has drawbacks. AI use in education has raised important problems about what should be taught and how, its social and ethical ramifications, and the worsening of digital divides and learning inequities, especially among marginalised and underprivileged groups (UNESCO, 2022). The most significant challenge of using AI in education has been the prevalence of generative artificial intelligence (GenAI), which was popularised by OpenAI's chatbot ChatGPT on November 30, 2022. The GenAI, an artificial intelligence tool, generates content in response to natural-language conversational

interface requests and draws on webpage content (UNESCO, 2023). Natural language writings, graphics (photos, digital paintings, cartoons), films, music, and software code can contain content. GenAl is trained to statistically analyse the distribution of words or other elements in webpages, social media conversations, and other online media to identify and repeat common word patterns that follow other words (Anders, 2023).

GenAl can create new content, but it cannot comprehend real-world objects or social ties that underpin language, therefore it cannot create new ideas or solutions. GenAl is also unreliable. GenAl tools like ChatGPT can give reasonable responses, but they are not accurate (OpenAl, 2023). The ChatGPT is the most popular GenAl tools application in education, used for lesson planning, instructional methods, classroom organisation, lecture plans and presentations, student grading, and creating a stimulating learning environment. Nearpod, Google Classroom, Copilot education.ai, and Gradescope.ai are GenAl apps.

Sharma (2023) aptly summarised the challenges of using GenAl in education to include: (1) Integrity concerns – GenAl is a technology that learns from existing systems. If data from the existing systems which GenAl learns from is biased, the GenAl output will show biases. Therefore, students learning through the GenAl system will assimilate the bias without knowing about it. (2) Security and privacy – GenAl systems need access to huge amounts of data to generate content. However, if there are data breaches and unauthorised access to such data, this results in threats to security and privacy of such data. Invariably, such data are either comprised or jeopardised. (3) Offering customised teaching and learning solutions – GenAl often leads to the provision of customised teaching and learning solution through automation. Therefore, over-reliance on it can lead to elimination of the human factor in the educational landscape which prevents real-time interaction between the teacher and the learners. Real-time interaction between the teacher and learners is inevitable in educational transactions. In essence, GenAl must never be over-relied upon to replace teacher-learner interaction and relationship because teachers cannot be displaced by machine (UNESCO, 2019).

Similarly, the controversies emanating from the application and use of GenAl in education were well-documented by UNESCO (2023) to include: (1) Digital poverty - GenAl relies on large data and processing power, which are crucial for economic development and individual digital prospects. However, countries and people without access to or affordability of data face 'data poverty' (Marwala, 2023). Data generating and processing powerhouses are mostly in technologically advanced Global North countries. Invariably, GenAl models, like ChatGPT, are trained using data that represent Global North values and norms and are unsuitable for data-poor communities in many less developed Global South countries. (2) Limited regulatory oversight and governance of GenAl - While GenAl may improve human performance, companies pushing it lack democratic control (UNESCO, 2024). This has raised concerns about regulating access to and use of domestic data collected on a country's territory. Thus, countries, especially developing ones, must pass suitable legislation to control and govern GenAl for public good. (3) Content misuse — GenAl models rely on scraped internet material, including texts, sounds, codes, and images, without permission. Thus, numerous GenAl are accused of IP infringement. To prevent data rights violations, researchers, teachers, and learners must be aware of data owner rights and ensure GenAl tools comply with regulations. (4) Internet pollution from GenAl-generated content – GenAl-generated materials may appear accurate but contain errors, bias, and harmful statements (Bender, Gebru, McMillan-Major, & Shmitch). Unfortunately, most students worldwide are accessing these toxic materials online. Learners without content source or topic understanding are at risk. To prevent the spread of polluted materials, researchers, teachers, and students must be aware that GenAl systems can propagate objectionable and unethical content. (5) Inaccurate text production - GenAl models, such as ChatGPT, can generate convincing but inaccurate texts with biases and damaging statements. GenAl systems only repeat language patterns from their training material, mainly online texts. GenAl rarely creates original real-world content. GenAl can't understand anything and generates erroneous text. Using GenAl technologies, especially ChatGPT, to generate texts and materials for educational delivery requires caution by researchers, teachers/lecturers, and students. (6) Limited viewpoint variety - GenAl solutions, such as ChatGPT, rely on the values of data owners and developers to answer questions or topics. These technologies' output or answers are more likely to repeat the words in their training data. This restricts multiple opinions and ideas. Researchers, teachers/lecturers, and students must be mindful that any internet content they acquire or distribute is based on the creator's imputed facts, not numerous opinions or ideas that may be twisted. (7) Fake image creation – GenAl systems, like ChatGPT, can edit images and videos to create bogus ones that are hard to spot. GenAl makes it easier to produce phoney photographs, movies, news, and incorporate people's faces into something bogus without their agreement. Disinformation, misinformation, and hate speech can be propagated with GenAl. This is wrong and illegal. Thus, researchers, teachers/lecturers, and students must be aware that internet content may have been modified and utilised unethically. (8) Insufficient institutional policy or guidance on GenAl systems – UNESCO (2023) found the education sector unprepared for ethical and pedagogical integration of Al tools, with significant implications. The UNESCO Global Survey of over 450 schools and institutions on their readiness to use Al tools in education and research made this claim. The result showed that less than 10% have institutional policies or formal advice on generative Al uses. Due to a lack of national legislation (UNESCO, 2023). To overcome these challenges and controversies associated with the application of GenAl in education, UNESCO (2022) published a document entitled "Guidance for generative Al in education and research" to support the planning of appropriate regulations,

policies and human capacity development to ensure that GenAI becomes a tool that genuinely benefits, empowers teachers, learners and researchers.

Insights into the UNESCO's (2022)'s Publication on Guidance for Generative AI in Education and Research

As GenAI systems are rapidly spreading in the education sector, the above-mentioned UNESCO' publication advocated calls on governments of UNESCO Member States to regulate the use of GenAI in schools and in education generally to ensure a human-centred approach (The UNESCO Courier, 2023). This publication, which builds on the 2019 *Beijing Consensus on Artificial Intelligence in Education,* the UNESCO's 2021 *Recommendations on the Ethics of Artificial Intelligence*, and the UNESCO's 2022 *AI and Education: guidance for policy-makers,* proposes a comprehensive set of recommendations to guide governments in the development and implementation of sector-wide policies on GenAI in education and research. The recommendations are:

Promote inclusion, equity and linguistic and cultural diversity

The document calls on government to recognise the critical importance of inclusion and address it throughout the lifecycle of GenAI by: (1) Identifying those who do not have or cannot afford internet connectivity and take action to promote universal connectivity and digital competencies in order to reduce the barriers to equitable and inclusive access to AI applications. (2) Developing criteria for the validation of GenAI systems to ensure that there is no gender bias, discrimination against marginalised groups, or hate speech embedded in data. (3) Developing and implementing inclusive specifications for GenAI systems and implement institutional measures to protect linguistic and cultural diversities when deploying GenAI in education and research.

Protection of human agency

While GenAI may be used to challenge and extend human thinking, it should not be allowed to usurp human thinking. Therefore, when designing and adopting GenAI, protection and enhancement of human agency should always be accorded core consideration.

Monitor and validate GenAI systems for education

Ethical risks, pedagogical appropriateness and rigour, and impact on students, teachers and classroom/school relationship should be taken into core consideration in the design, development and deployment of GenAI and should be carefully validated and monitored.

Development of AI competencies including GenAI-related skills for learners

Development of AI competencies among learners is key to the safe, ethical and meaningful use of AI in education and research.

Build teachers' and researchers' capacities to make responsible use of GenAI systems

UNESCO's (2023)'s survey data on the governmental use of AI for education revealed that only seven countries (China, Finland, Georgia, Qatar, Spain, Thailand and Turkiye) reported that they had developed or were developing frameworks or training programmes on AI for teachers. This implies that teachers in most countries do not have access to well-structured training on the use of AI in education. The publication, therefore, urged countries to develop frameworks and training programmes to prepare teachers for the responsible and effective use of GenAI.

Drawing on multiple stakeholders for policy development on GenAI in education

In the development of policy framework on effective and ethical use of GenAI in education and research, the publication also urged countries to adopt intersectoral and interdisciplinary approaches.

Descriptions of Project Initiatives on Inclusive and Equitable Use of AI in Education

Many project initiatives on inclusive and equitable use of AI in education have been developed across the world which were comprehensively discussed in UNESCO (2019) published document entitled *Artificial Intelligence in Education: Compendium of Promising Initiatives.* Some of these project initiatives include:

Helping Socially Vulnerable Children through Artificial Intelligence in Schools

This project initiative, http://www.fundacionqt.org, is a process of training and educating girls and boys in public schools for the development of skills in AI using digital twin technology through programming. It seeks to empower children and promote their proactive leadership in designing proposals and creating solutions for solving socio-economic and educational problems. The project was initiated by Quiros Tanzi Foundation and has Costa Rica as its geographical reach. Through the programme, children are offered better opportunities for digital social inclusion so as to develop their technological fluency to improve their

learning processes. Thus, the children develop some of the necessary competences of the Al era from an early age, so that over time they can become high achievers in their future work and businesses.

Offline Data and Model Training for Inclusive Al for Students and Teachers

This project initiative, http://www.learningequality.org/kolibri/, with Guatemala, India, Jordan, Kenya, Mexico, Tanzania, and Uganda as its geographical reach, explored the challenge of using machine learning to support education in communities without internet access. It was initiated by *Learning Equality*- a non-profit organisation incorporated in 2013 with offices located at the University of California, San Diego, USA. The co-founder Richard Tibbles created the *Kolibri* application and learning platform - an offline learning platform designed to bring the benefit of digital experiences to places with no or limited internet connectivity. The platform brings curriculum-aligned open educational content to offline learners and allows teachers to track and monitor students' progress. The *Kolibri* platform organises content in a cloud-based library where it can be downloaded by teachers and learners and used offline whether they are in schools or elsewhere. It is reported that *Kolibri* is being used in over 150 countries worldwide with estimated hundreds of thousands users.

Al for Education Interventions Beyond the Classroom

This project initiative, http://www.freeshs.gov.gh/, with Ghana as the geographical reach was developed by Kwaku, Kyei Ofori of the National Information Technology Agency in Ghana. The project involves the use of Al to construct a virtual learning environment that engages students when they are away from the physical classroom. The project was developed with the believe that innovative Al applications and tools have the potential for building a low-cost virtual learning environment and making learning more interactive. The project focuses on adaptation of Al applications and virtual learning environments for mobile technology. It also focuses on enrolling and assessing students for specific courses such as STEM via digital learning platforms. The strength of the project lies in the prevalence of mobile technology which provides a suitable environment for the conceptualisation and implementation of Al-driven virtual learning environments.

Al for Literacy Education in Least Developed Contexts

This project initiative, http://dig.watch/resources/innovative-applications-ai-education-and-youth,
with Africa and Caribbean Countries as its geographical reach, was developed by Bosen Liu the founder of Ladder Education Group which invented a solar-based hardware tool for processing offline-based software that includes offline voice recognition system to support content aimed at teaching basic English through instruction using local dialect. The educational content consists of (1)'Friend to Talk' function which uses voice recognition technology for spontaneous conversational exchange in dialect-to-English; (2) 'Friend to Explore the World' function which uses voice recognition games to promote global citizenship education in local dialect; and (3) 'Friend to Learn' function which aims at providing pronunciation correction for English. The strength of this initiative lies in its exploration of the application of offline-based software in contexts with no power supply.

Designing Al Projects with Low-Cost Technology for Researchers and Learners in Disadvantaged Populations

This project initiative, http://scienceresourcesafrica.com, with Guinea-Bissau and Sierra Leone as its geographical reach was developed by *Science Resources Africa* (SRA)- a non-profit organisation based in sub-Saharan African. The aim of the initiative is to develop projects in which Al is used to tackle some of the challenges faced by vulnerable populations particularly women and girls in the two countries. The practical relevance of the project lies in the use of low-cost computing technology to facilitate inclusive and equitable education among vulnerable populations with the aim of promoting good health while the strength lies in the choice of available, cost-effective technology as a means to explore the development and applicability of Al in low-resourced, underdeveloped contexts.

Enhancing the Learning Process of People with Special Needs Using Wearables and Al

This project initiative, with United Kingdom (UK) as its geographical reach, proposes enhancement of learning for individuals with special needs by collecting holistic data through wearable technology, commonly used in monitoring individuals' various physical activities and biological signals, and analysing these data through machine-learning models. The models are then used not only to identify, classify and understand the factors that influence learning but also to enhance the overall learning process. The project initiative was developed by Karthik Shivashankar of the University of Surrey and Venkat Bakthavatchaalam of Plymouth University in UK. A holistic (physiological, psychological and technical) picture is explored by using multiple sensors that measure both the physical and emotional states. The wearable device is equipped with sensors measuring skin temperature and conductivity, muscle activities, heart rate and motion. Data points can be visualised using s mobile app in real time, thus making it easy and quick to view data on anxiety and heart-rate levels during different learning processes. This project initiative combines the capacities of existing data collection devices with machine-learning algorithms in pursuit of deeper understanding of the learning process.

Global Digital Library (GDL)

This project initiative, http://digitallibrary.io, with Norway, Kenya, Bangladesh, Cambodia, and Ethiopia as its geographical reach, is a digital platform with Al components aimed at increasing the availability of high-quality, early-grade reading resource, including reading instruction books and storybooks, in underserved languages worldwide. The Global Digital Library (GDL) was launched in April 2018 by the Global Book alliance. The GDL-platform is initially operated by the Norwegian Digital Learning Arena (NDLA) while Norwegian Agency of Development Cooperation (Norad) has the overall project management responsibility. The platform was launched with an initial 900 resources in 15 languages, including Kiswahili, Bangla, Hausa, and 7 Ethiopian languages. At the time of the launch, the GDL platform included a website and a native app for Android, providing users with the option of (1) reading titles on their mobile phone, tablet or computer, (2) downloading for print, (3) downloading the mobile app which provided with extended offline capabilities, and (4) translating titles into an increasing number of languages. The Global Digital Library has a strategy of sharing all system code under a free license. This makes it possible for other projects to reuse the technology to create new solutions.

Empowering Girls and Mothers to Use Al to Solve Problems in their Communities

This *Al Family Challenge* project initiative, http://www.curiositymachine.org/aichallenge/, runs across 13 countries and aids approximately 4,500 underserved participants. It was developed by *Iridescent*- a USA-based non-profit global engineering and technology education organisation- which supports low-income communities (especially girls and mothers) to solve problems in their communities using engineering and technology. The *Al Family Challenge* is a free, hands-on, online Al education programme that brings together families, schools, communities, and 'technology know-it-all' to give everyone the chance to learn, play and create with Al. Lessons learned from the programme include methods of introducing Al concepts in hands-on and low-cost ways to reach audience with low literacy levels. The programme also engages educators with no technology experience to teach an Al literacy programme and engages industry and local businesses to support the programme.

Developing Al Skills to Ensure an Inclusive Society

This project initiative, http://www.odysseyedufoundation.org, with Nigeria has its geographical reach, was developed by *Odyssey Educational Foundation* founded in 2013 as a non-governmental and not-for-profit organisation based in Abuja, Nigeria. The project offers training on Al and machine learning to school children together with their families in an after-school and weekend setting. School children and their parents are introduced to topics such as self-driving cars, neural networks and machine learning using the *Machine Learning for kids' tool* developed by IBM. They are exposed to a curriculum developed by Odyssey's partners that takes them through a practical course of about eight classes followed by a machine-learning class where they learn *Animal Classifier* and object recognition and use the skills they have gained to train their model and test it. They are then tasked to look for a problem in their communities and use their skills to provide an Al or mobile app solution to the identified problem.

Al to Ensure Equitable Access to Education Globally

This project initiative, http://www.century.tech, uses an Al learning platform to provide accessible and effective education to students. The project was developed by CENTURY *Tech*, a private sector organisation based in United Kingdom (UK) and founded by Priya Lakhani. The platform had been used in countries like Bahrain, Belgium, Brunei, Egypt, India, Italy, Saudi Arabia, United Arab Emirates, and United Kingdom. Through the use of internet-enabled device, Al is used to get information on how each individual student learns and to set-out a personalised learning path for each student. It is also used to provide learning support to students through access to a vast library of learning content. As students learn on the *CENTURY* platform, every click, score and interaction is recorded. These data are fed into Al algorithms to get information on how each individual learns and then plot the most effective route through learning material for each individual student. Gaps in foundational knowledge are quickly identified and remedied, weaknesses are scaffolded, and strengths are built upon, all with automated, constructive feedback provided at the point of need. Tailored material is provided based on a range of factors including a student's emotional state and pace of learning. Teachers are provided with meaningful insights into learners need through data dashboards. Teachers also benefit from the platform's time-saving features, such as auto-marking questions, automatically collating data and providing a ready-to-use bank of high-quality resources.

Lessons Derivable from the above Projects Initiatives

The lessons derivable from the discussed project initiatives revealed the following: (1) The Al platforms and projects described above are meant to create awareness and understanding of Al itself, to facilitate inclusion in the school system and education, and to ensure equitable access of students to learning resources. Therefore, education policy-makers and other stakeholders in Nigeria must become aware of these project initiatives on how Al can be incorporated in the school system and education generally and have access to the effective use of AI technologies to build inclusive and equitable learning for all. (2) The contexts of implementation of the described project initiatives are diverse in nature. Some of these projects are designed

in environments with no internet connectivity or electricity, some are designed as an educational intervention beyond the classroom, some for literacy education, some to empower people to solve problems in their communities, and some for people with specially needs and socially vulnerable children, among others. Therefore, policy-makers and stakeholders in the education industry in Nigeria must have an in-depth awareness and knowledge of the inclusive and equitable use of Al in diverse aspects of education. (3) The discussed project initiatives clearly indicated the indices to adopt when developing inclusive and equitable Al projects in education. The indices are: (a) The geographical reach – Information must be briefly and clearly provided on the coverage area of the project. (b) The description of the project initiative (The What of the Project) – The project must be briefly described to show why it was developed. (3) The initiators, supporters and implementers (The Who of the Project) – Information on those who initiate, support, and implement the project must be briefly provided. (4) The problem addressed (The Why of the Project) – The problem that the project is developed to address must be briefly stated. (5) The brief background details of the project (The How of the Project) – The processes for the implementation of the project must be briefly narrated. (6) The successes and challenges – The successes recorded and challenges encountered from the implementation of the project must be clearly highlighted and discussed. (7) Practical and theoretical issues pertaining to the project (The insights of the project) must be briefly stated. (8) The stand-out features of the project initiative (The strengths of the project) must be clearly stated. (9) Link(s) – The project details must be made available in the internet and link(s) for accessing the project details must be clearly provided.

The discussed project initiatives clearly identified individuals and non-profit NGOs as the major initiators, supporters and implementers of the initiatives. The discussed project initiatives clearly revealed the in-built mechanisms for funding of the initiatives and for addressing the challenges encountered. The discussed project initiatives clearly revealed that inclusive and equitable use of Al in education is inevitable if properly conceptualised and developed. Some of the discussed project initiatives came from developing countries like Nigeria and Ghana. This clearly shows that developing countries can equally develop inclusive and equitable Al projects to enhance education and learning among the people. The discussed project initiatives clearly show the direction for policy consideration on Al in education in Nigeria. These include the need for Nigeria to develop a comprehensive public policy on Al for the education of diverse group of people, the need to ensure inclusion and equity in Al in education, the need to prepare teachers for Al-powered education, the need to develop quality and inclusive data systems, the need to promote significance of research on Al in education, the need to promote skills development for jobs and life in the Al era, and the need for the development of ethical framework on the inclusive and equitable use of Al in education.

CONCLUSIONS

Developing an inclusive and equitable Al projects is inevitable in the Al era. This is because Al has the potential of addressing some of the biggest challenges in education and learning practices. Therefore, education policy makers and other stakeholders must take into consideration the key parametres for developing inclusive and equitable Al projects in education and must also become weary of the use of generative artificial intelligence (GenAl) in education arising from the many challenges and controversies associated with it. Regulating GenAl to harness the potential benefits for education requires the development of appropriate policy. Therefore, education policy-makers in Nigeria must canvass for policy development on ethical, inclusive and equitable use of Al in education. In the development of such policy framework, education policy makers must take into consideration the recommendations specified in the UNESCO's 2022 publication on guidance for generative Al in education. Above all, the inclusive and equitable use of Al in education in Nigeria requires large-scale initiatives and access to Al platforms including resources.

AUTHOR CONTRIBUTION STATEMENT

To ensure the development of inclusive and equitable use of Al in education in Nigeria the following recommendations are made: (1) Policy development on inclusive and equitable use of Al in education – The importance of policy development on inclusive and equitable use of Al in the educational landscape must be understood by key education stakeholders such as policymakers, curriculum developers, schools'/institution's administrators. Particularly, education policy makers must champion policy development on inclusive and equitable use of Al in education in Nigeria. This must be given top priority in the education sector plans. (2) Special funding on the development of projects on inclusive and equitable use of Al in education in the budgetary allocation - Education policy makers in Nigeria must advocate special funding from the education budgetary allocation for the development and implementation of inclusive and equitable Al apps in education. This will help in overcoming challenges of funding and implementation of the developed apps in the education system. (3) Universities must take the lead in the development of projects on inclusive and equitable use of Al in education - Universities are found to be the major initiators, supporters and implementers of the discussed project initiatives. Therefore, it becomes imperative for universities in Nigeria to take the lead in the development of projects on inclusive and equitable use of Al in education. (4) Private sector partnership/collaboration in funding of projects on inclusive and equitable use of Al in education - Development of inclusive and equitable use of Al in education apps must clearly specify funding pattern to ensure successful implementation. The private sector partnership and collaboration can be sought to ensure injection of fund in the development of inclusive and equitable Al

in education apps. (5) Development of sustainability plan - Development of projects on inclusive and equitable use of AI in education must clearly specify the plan for sustainability of the project initiative. The following should be contained in the sustainability plan: short-term and long-term impacts of the project initiative, schedules details and resource management, building of success measurements and project dimensions must be built around sustainability, selection of sustainable project inputs and materials, and more transparent project reporting and communication. (6) Development of evaluation plan – An evaluation plan is a written document that describes how the project initiative will be monitored and evaluated. Therefore, development of projects on inclusive and equitable use of AI in education must clearly specify the evaluation plan for measuring results and impacts. The following should be contained in the evaluation plan: the timetable and work plan, data collection methods to answer the problem necessitating the project initiative, data collection tools and activities, data analysis, the main findings, lessons learned, and recommendations. (7) Development of policy framework on GenAI – Nigeria, through the education policy-maker, must develop a policy framework for ethical, inclusive and equitable use of GenAI in education. (8) Development of institutional formal guidance policy on the use of GenAI systems - Management of higher educational institutions in Nigeria must also develop institutional formal guidance policy for creative use of GenAI in teaching, learning and research in each institution.

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