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ARTIFICIAL INTELLIGENCE AND TRANSFORMATION OF EDUCATION IN NIGERIA

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Abstract

This study intuitively discussed benefits and drawbacks of AI as well as the transformation of educational systems in Nigeria. This study outlined drawbacks of AI ranging from cyber safety concerns worldwide to warranted repairs and maintenance, posture of risk for catastrophic losses and failures in event of malfunctions and economic damage, high cost, no human replication, no improvement with experience, creativity and unemployment. The study posited that the benefits of AI in education overweighed its risks, fear and challenges. AI could act as dependable assistant to classroom teacher; does not make teachers jobless and the country would benefit if AI is adopted and expanded in Nigeria's schools. This study recommended that governments should provide necessities for schools to embrace Artificial Intelligence in Nigeria's schools. Schools should provide nonviolent and elastic computing environment for research to enhance personalized learning outcomes. Students in Nigeria should embrace Artificial Intelligence in education since it is the requirement for motivation, enthusiasm and the opportunities for experimentation as well as simulation.

Keywords: Artificial Intelligence, Education, Teaching, Learning, Nigeria

Introduction

In this contemporary period Machine Language (ML), Robotics and Artificial Intelligence, (henceforth simply referred to as AI in this write up) witness speedy growth in all aspects of our lives, education inclusive. The focus of AI in education therefore should be the exposition of incoming generation to AI very early in life such that they could utilise the technology in the classroom setting. Teachers could also pick up from the capability of many learners being able to use AI through social networks platforms such as WhatsApp, Instagram and Youtube; this could be transferred and be opened to advantageous educational programs and applications. This is as noted that the

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"rapid advancement of technologies such as AI, ML and robotics impacts all industries, including education (Anonymous 2022). According to the scholar, Global Market Insights Inc. predicts that the AI education market could have a market value of $20 billion by 2027. The industry growth is good news, as AI can ultimately reduce the burden on teachers across the globe". In a dissimilar vein, teachers are skeptical that AI might replace and make them jobless. However, teachers are not at any risk of being replaced by robots and machine soon. AI programs could teach literacy or mathematics as programmed (input) by professionals who are teachers; the complex impartation of skills would still reside in the domain of human beings. At best AI would become programmed classroom assistant teacher, while teachers would be trained and retrained to be ICT and AI complaint.

In the long run, many benefits are accruable from deploying AI in education. Both students and teachers would benefit. In the literature the benefits include the following: teaching and learning resources could be accessed from any part of the world and at any convenient time. Time-consuming, tedious tasks such as record keeping or grading multiple-choice tests could be completed through AI automation. Frequently asked questions can be answered through chatbots. AI tutors and chatbots can be made available to answer questions at any time. Learning can be tailored and adapted to each student's goals and abilities through personalised programs. AI is already being applied successfully in several educational instances and it improves learning and student development, as well as educators' performance in emotional well-being, spotting and filling the gaps and children working alongside AI. Moonpreneur (2022) corroborated this when the author noted that probabilities like replacing human teachers, accessibility and expenses cannot be ruled out altogether. However, with systematic implementation, a practical approach, and proper planning, things will only fall in favour of teachers. AI should be considered as a tool or aid which humans can leverage to produce better results. The education sector too, would benefit from the incorporation of AI. When used efficiently with proper caution and vigilance, it can bring exceptional results for students and teachers. While Anonymous (ND) noted that AI in education is not about humanoid robots as a teacher to replace human teachers, but it is about using computer intelligence to help teachers and students and making the education system much better and effective.

Evolution and Meaning of Artificial Intelligence

In the mid-19th century especially between 1940 and 1950 John McCarthy an American computer and cognitive scientist coined the term "Artificial Intelligence". The term borrowed ideas from Mathematics, Statistics, Engineering, Sociology, Psychology, Economics and Geography. These multi disciplines work all together in a manner that mimic human. AI became a distinct academic discipline in 1956. AI is a component of

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computer science, a complex throughput of man-made machines, computer, software and applications.

AI combines two separate words; artificial and intelligence. Artificial refers to man-made, not natural, creation of human being. Intelligence means reasoning, perception or thought of. The two combined then mean using computer science and determined software and applications to making intelligent machines to work and reason like human being. Authors such as Chen, Xie, Zou and Hwang (2020) defined AI as a combination of many activities for designing the artificial in computers that are like-recognizing the speech, learning, planning and solving the problem. In other words, it can be defined as programming such machines which can think and act with some level of human intelligence. AI efficiently uses limited resources. AI could be computer programs to solve complex problems same like humans solve the problems. Anonymous (NA) saw AI is a simulation of human intelligence into a computer machine so that it can think and act like a human. It is a technology that helps a computer machine to think like a human.

AI aims to mimic human behaviour. AI has various uses and applications in different sectors, including education. Arora (2021) said AI is required to create a computer programming system which has an intelligent behavior with the capacity to explain and advise its end users. AI is an algorithm which Helps machines to find solutions to complex problems. AI could be categorised as Narrow AI also referred to as "Weak AI, that needs the help of humans along with their programming and Artificial General Intelligence (AGI) referred to as "Strong AI, this is now seen everywhere in today's world.

The main objective of AI-based machines is to imitate human activities such that they can be used to augment their natural abilities or ease their lives. AI also simplifies research activities such as collection of data, analysis of data and allows usage of complex statistics. Some of the major AI-based software includes Email Filters, LinkedIn, Chatbots to Facebook Proactive Detection, Google Predictive, Music Recommendations to Maps and Directions, Fraud Prevention. Machine Learning Engine, TensorFlow, Azure Machine Learning Studio, Cortana and IBM Watson are functioning smoothly because of AI.

The popularity of machines using AI makes them useful in many fields such as Mathematics Medicine, Computer Science, Information Science, Geography and Military. These machines often engage in complex tasks and processes; performing many of the same roles as humans without requiring training time. This, in turn, improves workplace efficiency and reduces downtime. The general benefit of AI is that it replicates decisions and actions of humans without human shortcomings, such as fatigue, emotion and limited time. Machines driven by AI technology are able to perform consistent, repetitious actions without getting tired and the ability to improve communications and information exchange (Anonymous, 2019 and Staff Writer, 2020).

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In the field of education, AI can automate basic activities in education, like grading, educational software could be adapted to student needs; it could also point out places where courses need to improve and students could get additional support from AI tutors. AI-driven programs can give students and educators helpful feedback, it is altering how we find and interact with information. It could change the role of teachers, it could also make trial-and-error learning less intimidating and data powered by AI can change how schools find, teach and support students. AI may change where students learn, who teaches them and how they acquire basic skills and Language understanding.

In the 1970s, AI in Education (AIED) has occurred as a specialist area to cover new technology to teaching and learning, specifically for higher education. The main aim of AIED is to facilitate the learners with flexible, personalized and engaging learning along with the basic automated task. Some popular trends in AIED include intelligent tutor systems, smart classroom technologies, adaptive learning and pedagogical agents. Its roles in education include: automating basic activities in education with AI, additional support for students with AI tutor helpful feedback to students and teachers with AI-driven programs, finding improvement required in course with AI. AI could change the role of the teacher and personalise education with AI. Generating smart content with AI in 3 ways - digital lessons, information visualization and learning content updates ensure. With AI, access to education for students with special needs and universal access are certain (Anonymous NA).

AI technology has not only promoted changes in schools' teaching methods, learning methods, campus environment and curriculum, but the entire education industry is also undergoing changes through AI (Karsenti 2019). Liua, Salehb and Huangc (2021) contended that with the development of AI technology, modern education will be combined with more technologies such as intelligent robots, speech semantic recognition, image recognition, machine learning, adaptive learning algorithms, quantum computing and block chain. These technologies are collectively referred to as intelligent technologies. These technologies have begun and continue to accelerate in conjunction with the education industry.

Benefits of employing Artificial Intelligence in Education

The benefits of employing AI in education are numerous. For instance Moonpreneur (2022) cited the following as the benefits of employing AI in classroom setting. AI can personalise college lectures to specific students and alter how examinations are administered. AI is used to personalise learning experiences, make more interesting content and give students real-time guidance to perform better. Others are Smart

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Tutoring Systems, Learning: Language and Educational Games. The scholar continued that AI could identify early signs of developmental issues in children; it is used in schools in adaptive learning software. If a learner has difficulty grasping a concept, the software will provide more assistance. On the other hand, if a student is making rapid progress, the software will assign increasingly difficult material to them. AI systems can easily automate activities such as grading papers, providing feedback on student assignments and more.

A notable scholar, Lynch (2017) said AI does not detract from classroom instruction but enhances it in many ways. According to the scholar, AI offers the following benefits in teaching and learning; personalisation, tutoring, grading, feedback on course quality, meaningful and immediate feedback to students. The author added that as educators, we all have fears about instituting large systemic changes and sometimes those fears are well grounded. However, we cannot afford to ignore the possibilities that AI offers us for dramatically improving the student learning experience.

In another submission, Hassan (2021) noted that "schools and colleges could use AI to improve their teaching methods and boost engagement. AI machines could be tailored to ask questions from students and add supplementary questions to ensure that students answer questions correctly and challenge students to enhance their learning experience. AI in education is only likely to expand from supporting learning to acting as an assistant, making learning interesting, helping teachers and automating grades, educators can truly benefit from AI. Anonymous (ND) listed the benefits of AI for Students to include: every time access to learning, better engagement and less pressure. In the near future, AI in education will step in three main ways, which are: performance personalisation, violation bias and combined assistance.

Like a coin having two sides, there are inherent disadvantages of AI often noted in literature. These disadvantages include: the breakdown of critical components and widespread use of AI, which raises cyber safety concerns worldwide. These machines often need repairs and maintenance. As with other emerging forms of technology, their novel use poses a risk for catastrophic losses and failures in the event of malfunctions and economic damage. Other disadvantages of AI include; high cost, no human replication, no improvement with experience, creativity is not the key for AI and unemployment (Anonymous, 2019 and Staff Writer, 2020). .

Transforming Education in Nigeria in compliance with Artificial Intelligence

The benefits of AI technology should be reaped in the field of education in general. To be specific these reaped benefits of AI could be directed at promoting teaching and learning at the three levels of education in Nigeria. These would enhance teaching and learning at primary, secondary and tertiary institutions in four different aspects. AI technology could be useful on reformation of the 'System, learning, teaching and stakeholder'. There must

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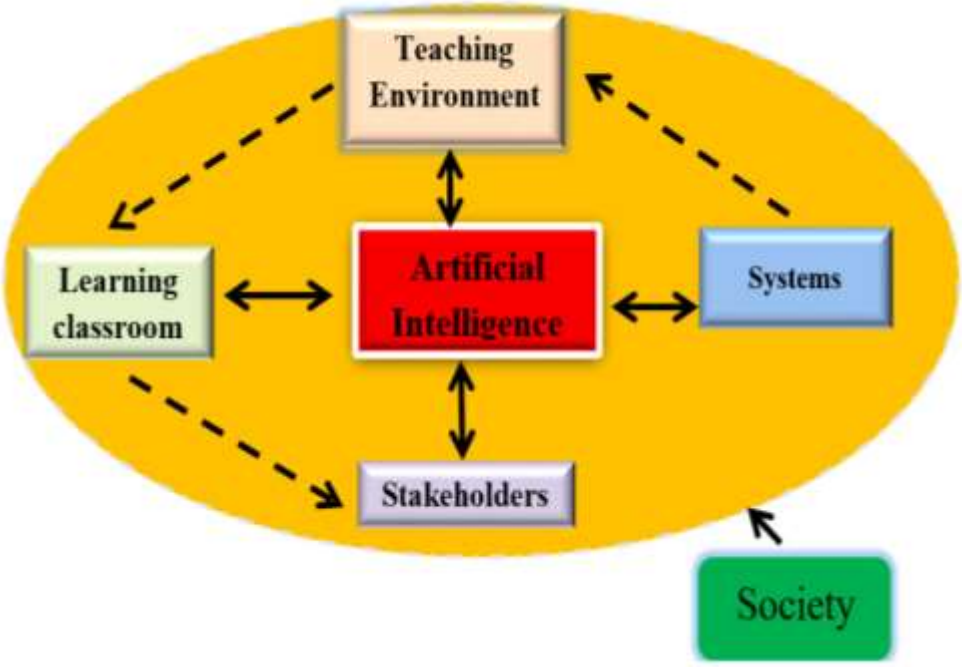
be a reformation or overhauling the AI and i) Systems, ii) Learning Classroom, iii) Teaching Environment and iv) Stakeholders. These components were briefly described below.

i. Systems: systems herein refer to activities of supervising, monitoring and coordinating of teaching and learning at the primary, secondary and tertiary levels. These activities are however not limited to curriculum development, setting minimum standards and drafting of syllabus and note of lesson. The relevant institutions among others include the supervision modes as conducted by the Ministry of Education and relevant parastatals such School boards, State Universal Primary Education Board and the Directorate of Higher Education. Planning and implementation of educational content and activities by educational agencies and agents such as West African Examinations Council (WAEC) and National Examination Council (NECO) that conduct external school certificate examinations, while Joint Admission Matriculation Board (JAMB) conduct and supervise admission in the universities, polytechnics, colleges of education and other tertiary institutions in Nigeria. Teacher Registration Council of Nigeria (TRCN) sees to the teaching professionalisation and certification in Nigeria. National Council for College of Educations (NCCE), National Universities Commission (NUC), National Board for Technical Education (NBTE) and National Education Research Development Commission (NERDC), Tertiary Education Trust Fund (TETFund) and other agencies supervise and monitor education activities at the tertiary institutions in Nigeria.
ii. Learning Environment: this includes the students:' age, intelligent, emotional, social and adversity quotients, readiness and ability to learn, entry behavior and family background.
iii. Teaching environment: of great importance are the teaching methods employed by the teachers, teaching resources, materials and aids, teachers' qualifications and professionalism.
iv. Stakeholders in Education: these comprise the schools themselves, parents and guardians of the learners, the industry that would employ them and develop AI and finally the society and the governments.

All these (Systems, Learning classroom, Teaching Environment and Stakeholders) must be actively involved in the eventual adoption and deployment of AI at the Nigeria's schools. Figure 1, briefly shows the interrelationship that exists between them. There is transmission of instruction, supervision and of course the teaching modes from the system to the teacher. The teacher in turn supplies classroom deliveries to learners in the classroom. Learners after being refined would become useful to the society. All these activities are carried out within the society. This is as shown in Figure 1.

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Legend

The Transmission not being studied

The interrelations between AI, System, Teacher, Learner and Stakeholder

Figure 1: Oladapo, O. S. (2023) Transforming Education in Nigeria's Schools, Interrelations between Artificial Intelligence and System, Learning, Teaching Environment and Stakeholders

Necessities for expansion of Nigeria's schools in the dispensation of Artificial Intelligence

Given the stated benefits that could be reaped from employing AI in schools, coupled with its strengths and weaknesses as well as the associated development of teaching and learning; Nigeria's schools should be prepared to explore, promote new necessities for erecting and running schools in this new epoch of shrewdness.

In the first instance, it is important to have high-powdered teachers that were trained and adapted to the dictate of development of education in the area of ICT and AI put in place. There is also the need to find teacher education resource base, enhance teacher training institutions, motivate teachers to explore and cultivate AI. Outstanding principals and headmasters should be trained to conduct intelligent education leadership training.

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Teachers Registration Council of Nigeria could be of tremendous assistance in this area, especially as it relates to certifying professional teachers.

Schools should endeavor to achieve its goals of acquisition of knowledge; this should not be selective but inclusive as well as more accessible and more guaranteed. AI technology is a driving force in solving challenges of intelligent education. Schools should also be ready to cope with avalanche of data and information, algorithms, new order in education, governance, ethics and security. There should be mutual relationship between AI industry (that produces and maintains them) and schools, financial support should be given to colleges of education, polytechnics, universities and research institutions in their scientific researches involving the development and deployment of AI.

Recommendations

This study puts forward the following recommendations in deploying Artificial Intelligence towards transforming the Nigeria's Educational System.

- Apart from strengthening the system, learners, teachers and stakeholders to embrace AI; governments and her agencies and agents should provide the necessities for schools to embrace the deployment and expansion of AI in Nigeria's schools.
- If schools provide a nonviolent, elastic and available computing environment for research, develop skills among students and provide a collaborative learning environment this would reinforce the importance of AI and ML to enhance personalised learning outcomes. Schools in the country must embrace these technologies and develop new methods of training and teaching to meet the expectations of millennial and the technological revolution
- Students in Nigeria should be encouraged to use AI and ML in education due to its high level of interactivity. It is also the requirement for motivation and enthusiasm and the opportunities for experimentation and simulation.

Conclusion

In the literature, there are inherently noted numerous drawbacks of AI, ranging from cyber safety concerns worldwide to warranted repairs and maintenance. The posture of risk for catastrophic losses and failures in the event of malfunctions and economic damage is another challenge. AI is also beset with high cost, no human replication, no improvement with experience, creativity and unemployment. Notwithstanding, the benefits and advantages of AI in education overweigh its challenges and risks. These

benefits are many and are still likely to expand. The major benefits of AI are that it could act as dependable and trustworthy assistant classroom teacher helping teachers. It does not necessarily make teachers jobless, teachers would only need to be trained and retrained. Deployment of AI in Nigeria could lead to win/win situation between the system, learners, teachers and stakeholders. More importantly, the country would benefit most, since the academic standard and improvement would be increased considerably if AI is adoptable in Nigeria's schools. Finally, AI could transform education sector; in fact, it plays a huge role when it comes to learning and teaching.

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