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The Role of Artificial Intelligence towards Changing Teacher Productivity in Nigerian Secondary Schools

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Abstract

Artificial intelligence shows promising improvement which may impact human lives and also contribute enormously to advancement of economies in various aspects that includes education, it is however faced with numerous challenges. This paper examines the Role of Artificial intelligence towards changing teacher productivity in Nigerian secondary schools. This paper employs a narrative review to highlight challenges confronted with integrating AI into teaching as well as changing teacher role. The Purpose of the study is to state the importance of integrating AI into the Nigerian Education System especially at secondary school level and give recommendation on how to manage challenges The review data was obtained from journals. The paper recommends that teacher training is important, to enable them to be acquainted with the workings of the application systems, Issue of digital divide should be properly addressed. Teachers' role is essential as mentors, motivators, facilitators and irreplaceable, therefore their welfare should be given a priority over every activity. Students need to understand how AI works, its ethical implications, because the future workforce will require knowledge in working alongside AI.

Keyword: Artificial intelligence, teacher roles, AI innovations, students, AI integration.

Introduction

Education is a process of acquiring knowledge, skills, values and understanding through various methods such as teaching, training or research. It typically takes place in

formal settings like schools or universities as well as informally through life experiences. Teachers are personnel employed to impart knowledge to students, they undergo training at various levels to gain skills on how to impart such knowledge to students. A teacher may know his subject matter well, but imparting the knowledge into someone requires skills which are acquired through effective training. Teachers are also the implementers of curriculum, when educational planners design contents to be taught, it is the teachers that implement the syllabus within the curriculum. In Nigeria the government has instituted a council for teacher's registration (Ayeni,2020). The Teacher Registration Council of Nigeria (TRCN) is saddled with the responsibility of licensing professional teachers. All teachers in the country are encouraged to become professional so as to increase performance. In developed countries of the world only teachers with license are allowed to teach. To further encourage the need for productive teachers, Adamawa state government has approved an allowance for professional teachers under the teacher salary scheme all in an effort to get productive teachers to teach. Only teachers with license are eligible for the package. Teachers play a pivotal role in the education sector. It is widely believed that no education system is greater than the quality of her teachers. For an education system to achieve the desired goals and objectives, the teachers' efficiency must be taken into consideration. The future of any educational level depends not only on the psychological factors, but also on the emotional factors of teachers (Gistuati, 2020). Expectedly, the teachers put in their best when they are happy with the job and their performance increases when they are effectively supervised. Gistuati (2020) opined that teachers' performance means increase in output through better performance. It involves interplay of various elements in the school's system. Increased performance is usually attained when teachers are satisfied with their job and are effectively supervised (Ayeni, 2020).

However, Artificial intelligence refers to the simulation of human intelligence in machines that are designed to think and learn like humans. Artificial intelligence comprises of a range of technologies and method which include robotics, natural language processing, machine learning and computer vision (Barakat,Bourekkadi,Khoulji &Kerkeb,2020). AI is presently standing as the major force that is advancing every minute and changing the way we work and live, difficult task are becoming much easier, (Barakat,2020) et,al. AI is no longer confined to the realms of science fiction, it has fully integrated into our lives, the innovations has touched all facets of live, education, health, business, military, media etc, people are forced to accept the new reality.

AI integration into secondary schools in Nigeria, may be confronted with challenges of poor internet connectivity, use of computers to learn requires internet services which enable applications to run, also inadequate electricity is a major concern, especially in the rural areas, the epileptic power supply will affect the integration, inadequate funding of the education sector is also a challenge in acquiring hardware such as laptops, desktop computers or tablets that will be used by both teachers and students couple with high cost of paying developers, maintaining AI software. Nigeria has limited education budget and the funds made available to the sector is for paying teachers' salaries and construction of new classroom block, there is

therefore the need to increase funding, to enable the students and teachers to have access to more information and learn at their pace. (ogunyele, omobayode& fabiyi, 2021).
In Nigeria, where classrooms often consist of high class size and students of diverse traits of learning and with varying levels of proficiency and access to resources, AI driven educational platforms can help supplement the traditional teaching methods, through offering engaging learning experiences that cater to the learners needs. Notwithstanding these difficulties, the importance for AI in Nigeria is immense, the invention has the capacity to stimulate significant benefits to the economy, the integration of AI can increase production, creativity and general progress in all sectors of the economy.

Aim and objectives.

This study aims to highlight the essentiality of AI in changing teachers' productivity in Nigerian secondary schools. The following are objectives of the study

1. To review Artificial Intelligence integration in Nigerian Education system
2. To recommend prospects of AI in Nigerian Education system

Purpose of the Study

The Purpose of the study is to state the importance of integrating AI into the Nigerian Education System especially at secondary school level and give recommendation on how to manage challenges.

Artificial intelligence and changing teacher roles: -

Global change in technology and shift in people attitude have increasingly change societal values in the present decade. Presently school leaders are faced with enormous challenges of managing and controlling their workforce. Effective leadership requires understanding of this challenge (Talajic, Vrankic & Bach, 2024). Schools are struggling to integrate artificial intelligence in their system to gain its benefits through building competitive advantage and increasing productivity (Venkatesh, 2022). Artificial intelligence comprises of modern technologies such as internet of things (Wang, 2019) that requires adoption and usage. Through integrating AI into school, teachers can increase and boost their potential in making informed decision as well as improved operational efficiency which remain competitive in a rapidly changing environment (Talajic, etal, 2024). The use of AI helps in reducing potential proffering solutions by developing strategies to mitigate this and improve resilience (Venkatesh, 2022). Application of AI into school system automate routine task such as freeing up time for teachers to focus on their activities, support better decision making by providing recommendation which helps in finding out potential threats and opportunities very fast which enable schools to be in tune with changing times (Wang,2019).
AI helps teachers to change from manual grading in classroom to automated grading, most at time when teacher's give assignment or test to evaluate students perception of what has been taught, they spend enormous time in marking and assigning grades, especially in Nigeria were

a class contain up to eighty or more students unlike Europe and other developed countries were the number of students in a class is relatively low. AI provides automation of objective question scoring by instantly grading, which frees up more time for the teacher to attain to other activities. Presently, in Nigeria the Joint Admission and Matriculation Board (JAMB) a body saddled with the responsibility of conducting entrance examination into Nigeria's tertiary institutions is using automated scoring tool to mark and grade students, also the West African Examination Council (WAEC) is following suite, the council announced that from the year 2026, all its examination will be computer based, in other to improve efficiency and also curb examination malpractice. AI tools also makes classroom management to become easy, teachers traditionally often waste ample time reacting to students disruption of lesson and takes some of the morning lesson time to call register of students present or absent, AI can handle task of taking attendance as well as keeping the students busy accomplishing task on their computers, while the teacher only goes round to guide them, AI also send automated reminders, thereby reducing task on teachers. The AI tool ensures student feedback is immediate and continuous, unlike the traditional method were by teachers take longer time to respond to student assignment after submission. AI enhances adaptive learning, because teachers take a lot of time to deliver lesson to the entire class understanding due to different traits of student cognitive domain, some are slow learners, while others are average or exceptional, but AI allows students to learn at their own pace through personalized learning paths, identification of knowledge gaps such as the Knewton or Dreambox learning tool that create a unique dynamic learning path for every student and ensuring they are working at the appropriate level of challenge. (mohammed&shehu,2023).

Many countries are developing policies on how to integrate AI into their national education system, countries like china had made it a policy to integrate AI into the education system from primary school up to further stages of education. (zhang&lu,2021) Estonia which is a leading country in AI integration have heavily invested in AI tools, its policy emphasize empowering educators, not replacing them. Nigeria, recently made an education policy, by changing its school curriculum from primary, basic education as well as secondary school to capture AI tools, such as digital technology, the Nigerian education and research development council (NERDC) has introduced digital communication as a subject to be taught at basic education level and its made a compulsory subject.

Changing roles of teachers productivity through the use of AI.

Teachers are now learning facilitators, data analyst and mentor instead of the traditional method of knowledge delivery, AI does not replace teachers instead it transform and elevate their roles. Teachers role is to ensure that the school achieve its goals and objective, therefore the use of AI can analyze vast amount, of data quickly that enables teachers to make informed decisions and take appropriate steps and action that will help identify patterns and trends that might not be known using manual analysis, (Talajic etal 2024). AI models have the ability and foresight to forecast future trends which enables schools to make proactive decisions and plan

for various scenarios, understanding the competitive landscape gives an edge to the school about positioning and differentiating itself from other schools (Duangekanong, 2022). AI helps in creating strategies to achieve the school aims and goals including identifying competitive advantages as well as setting priorities. AI mostly assist teaching process by enabling deeper in sights, providing more agile and informed decision making as well as improving efficiency. It also strives to create a system that can perform activities that requires intelligence such as decision making, problem solving and pattern recognition. Schools can adopt various approach that can be tailored to suit the school goals and objectives, the approaches include; Partnership approach, this strategy can be used by schools to collaborate with partners in achieving the school goal and transitional approach strategy enable schools to manage changes as they occur, such as restructuring or cultural transformation and help to address issue of declining performance and helps to re-energize and restore competitiveness. (Duangekanong 2022).

Artificial intelligence also places emphasis on encouraging entrepreneurship and innovation to drive growth and this involves integrating digital technologies into teaching to enhance learning as well as placing emphasis on certain specific aspects of school business such as finance, human resource or marketing, through focusing on the overall school mission, vision and objectives. (Duangekanong, 2022). AI comes with new critical roles in classroom teaching that requires educators to teach students on how to use AI responsibly and ethically to avoid plagiarism .AI also turns the teacher from grader to analyst, the analysis enables the teacher to know whether a certain group of student needs to be re-taught or to give one on one support. The changing role is about a profound and necessary transformation because it is shifting the role from a primary source of knowledge to a facilitator of learning. Teachers' spend significant time teaching contents to the whole class, while AI handles it through personalized tutorials, interactive modules and videos. Teachers' also spend their leisure time for lesson planning, creating worksheet and developing rubrics which are largely solitary tasks, but AI can be used as a collaborative assistant to generate lesson ideas, draft rubrics, quiz questions and translate materials for multilingual learners. (mohammed&shehu,2023)

AI – Innovations

AI has a magnificent potential of doing several things done by humans in a quick and perfect manner, it has great potentials for improving efficiency of certain activities in education, agriculture, science and technology, health sector and lots more. The next future innovation of AI will comprise of unsupervised learning, transformer model and federated learning that will likely open up unimaginable opportunities, here are some of AI innovations.

GPT – 3.5 / GPT-4: New innovations in AI are developing extremely fast. GPT-3.5 has shown a remarkable ability to understand and generate human like text. The chat GPT-3.5 innovation can write essays, create poetry and answer questions. While chat GPT-4 which is the next evolution, is presumed to boost an even more astonishing parameter count to exceed 200

billion in scaling up unprecedented language understanding and generation capabilities. Barakat (2020) et,al.

Generative Adversarial Networks (GANS): This adversarial process has revolutionized the field of generative modeling and has become one of the most game changing solutions among the new technologies in AI. The statista report reveal that the world wide generative AI market had a valuation of $10.6 billion in 2022, with projected growth to reach $136 billion by 2031. Barakat (2020) et,al.

Explainable AI (XAI): This innovation aims to provide insight into how AI models arrive at specific decisions, making it easier for humans to trust AI generated outcomes.

Natural Language Processing (NLP): The NLP powered chat bots and virtual assistants are revolutionizing customer support, they can provide instant responses to customer inquiries, handle routine task and other personalized assistance, improving customer satisfaction and reducing operational cost. NLP models are used to generate high quality written content such as articles, product description and marketing materials. Barakat (2020) et,al.

Health Care: The benefits of innovation of AI in the health care industry were ground breaking. The algorithms have demonstrated exceptional accuracy in curing diseases like heart condition and cancer. It expedites drug discovery and reduces time and cost associated with bringing the new drugs to the market. According to fortune business insights, the global market for medicine was valued at $87.41 billion in 2022 and projected to grow from $94.44 billion in 2023 to$286.22 billion by 2030. With AI innovation health care is on the brink of a digital revolution following remarkable discoveries, it has become real life saver for the future. Barakat (2020) et,al.

Biometrics: The recognition of finger print is one of the widely used biometric methods at the same time facial recognition. However, latest AI innovation has advanced to applications such as access control, surveillance, user authentication and behavioral biometrics like voice recognition and keystroke dynamics. The future of biometrics promises to implement technologies in AI such as DNA based biometrics, brainwave authentication and gait recognition. The innovations will continue to change our reality. Barakat (2020) et,al.

Even flow AI innovation: This AI technology is showing how artificial intelligence and data driven technologies are transforming industries especially automotive and service sectors. It optimizes the scheduling of maintenance and repair appointments of cars, also optimize pricing margin and maximize revenue. Barakat (2020) et,al

Reinforcement learning (RL): It is a subfield of machine learning that draws inspiration from behavioral psychology. This is an AI innovation that had developed autonomous systems including self driving cars and robotics. Barakat (2020) et,al

Predictive Analysis: The predictive AI analysis has improved industrial operations especially in predictive maintenance, it helps businesses forecast equipment failures and optimize maintenance schedules, thereby reducing time waste, cost, risk assessment and fraud detection. Barakat (2020) et,al

Chat bots and Virtual Assistants: The main goal of employing chat bots and virtual assistants into your business is to improve customer satisfaction. It provides instant responses to customer inquiries and the new AI innovation have introduced multilingual which breaks down language barriers and simplify communication which contributes to improved productivity and time management. Barakat (2020) et,al

AI in Sales and Marketing: AI innovations have totally revolutionized the overall marketing process. The AI sales tools provide accurate sales forecasting and also changed the way businesses communicate with customers in marketing aspect. Barakat (2020) et,al

Data Analysis: The AI innovation in analysis of data has changed the way organizations extract large data, it improved data processing task from data collection and cleaning to transformation and storage. Barakat (2020) et,al

The development of artificial intelligence is rapidly changing the world especially in the development of renewable energies, ocean protection, energy and ecological footprint, solar and wind energy. Integrating AI into schools helps in improving overall teacher job performance.

How to curb challenges in integrating AI into school system

Addressing AI challenges require careful planning to abide by AI ethical standards and training in skills and technology. To overcome challenges confronted with integrating AI into school management the following strategies should be considered; Regulation: there is the need to engage with legal experts to ensure laws and standards are always adhered to and also develop organizational policies to regulate and comply with issues related to AI. Security: there should be security enhancement to curb cyber-attacks and protect data, more funding should be made on update, risk assessment that might likely mitigate security threats (How, & Cheah, 2024).

Training: Emphasis should be placed on training and development programs for teachers, also experts should be recruited and professional development in AI related field should be encouraged as continuous learning to simplify integration when integrating AI system into school, AI solutions that are compatible with existing system should be carefully chosen, also work with experience consultants to streamline integration using AI tools that can be integrated gradually (How, & Cheah, 2024). Many teachers' especially in the rural areas tend to be scared when it comes to using technology in teaching, some are unsure on to use it effectively or afraid that it might make them obsolete, professional development is essential because it emphasize that AI is an assistant not a replacement. Teachers need extensive training on how to redesign their pedagogy around them.

Ethical concern; Most teachers' have the fear that AI tool compromise academic integrity because it makes cheating and plagiarism easier, therefore making it difficult to assess what a student truly knows, but the way out is to teach students how to cite information gotten from AI and ensure their work pass the plagiarism test before assessment. Also, teachers should use methods of class presentations where students must explain their work and respond to

questions. Ask questions that connect the topic to real life, something AI cannot replicate, integrate lessons on the ethical use, make students critical consumers of the technology. Teachers' should be vigilant about data privacy, algorithm bias and preventing over reliance on AI.

Digital divide; AI gadgets such as laptop, tablet are expensive, not every student can afford, not all students have internet access at home, thereby creating a digital divide exacerbating inequality. The way out is to design AI activities that can be done and finished in school, using school facility provided for student use, don't give home-work. except, if every student have the same opportunity. Ensure all schools and students have access to these AI tools to prevent digital divide.

Enhance data quality: huge investment should be done in data cleaning and validation processes and ensuring collection and storage of data in a structured and accessible manner by implementing a robust data governance practices. There is also the need to inform all stakeholders the benefits of AI integration, involve teacher's early enough so that they will feel carried along and provide training to help employees adapt to the new application and processes. Addressing these challenges practically enables schools to better integrate AI into their system and leverage its full potential for improved decision making performances (How, & Cheah, 2024).

Artificial intelligence has significantly changed teacher's role, though the technology is not replacing teachers, but rather transforming their responsibilities. Teacher's role of giving knowledge is gradually transforming to learning facilitator, with AI tools teachers will now focus more on guiding, mentoring and facilitating, while students get the contents from learning platforms such as chat bots, tutoring systems, etc. Also, teachers can now devote more time on problem solving, creative building and critical thinking development, while the AI does the task of organizing schedules, grading objective questions and checking of students homework submitted online. Artificial intelligence influences what learners do and see, while the teacher plays the role of helping them to think critically, understand ethical issues. The way out of these challenges is not to resist AI but to embrace it, the most successful classroom is a class were both teachers' and students work together as collaborative partners (mohammed&shehu,2023).

Conclusion

AI changes how teacher's work and handle task such as grading and teaching, through helping the teachers' to monitor their student progress and adjust teaching strategies. Teachers performance is now judged on mentorship, emotional intelligence, critical thinking and creativity, it has shifted teachers role of giving knowledge to facilitating learning process. AI is essentially for reshaping human roles into higher level and essential for redefining teacher's role and improving job performance. AI presents several opportunities such as enhancing decision making, it can analyze several information to identify patterns as well as predict trends through providing data driven insight that enable teachers to make more informed

decisions, it can also power adaptive learning platforms that tailor educational content to individual student pace and learning style, it enable teachers' to identify knowledge gaps and provide target support. Integrating AI in secondary schools is very important in enhancing and transforming education from traditional method of imparting knowledge to a dynamic system that increases efficiency.

Suggestion for Further Studies

The researcher suggest further studies can be conducted on

a. Cost/ Benefit analysis
b. Pedagogical Integration and curriculum
c. Teacher Professional Development in AI

The goal of the research should not be to prove that AI works in Nigeria, but rather to provide evidence base for how, for whom and under what condition and at what cost could the AI tools be integrated effectively in Nigerian Education sector.

RECOMMENDATIONS

1. Teacher training is important, to enable them to be acquainted with the workings of the application systems.
2. Issue of digital divide should be properly addressed.
3. Teachers' role is essential as mentors, motivators, facilitators, they are irreplaceable, therefore their welfare should be given a priority over every activity.
4. Students need to understand how AI works, its ethical implications, because the future workforce will require knowledge in working alongside AI.

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