

Applying Artificial Intelligence in Literacy Education in Nigeria

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Abstract

The application of artificial intelligence in literacy education in Nigeria is timely as it provides teaching aid that spurs interactive learning in this fast developing world. In this paper, applying artificial intelligence in literacy education in Nigeria was investigated. Different procedures in the application of artificial intelligence in literacy education in Nigeria were shown to boost assimilation rate in learners thereby developing their domains of learning and increasing effectiveness. Results further reveal that in the use of artificial intelligence in literacy education, classroom interaction is enhanced and progress in learning is made in the presentations of facts and observations, the premise upon which learning is made fun. Based on these findings, the study recommends the use of artificial intelligence in literacy education in order to check the advantages associated with the use of artificial intelligence in literacy education in comparison with its demerits. Overall, this would allow adequate information for stakeholders and policy makers to determine the way forward as regards artificial intelligence integration in literacy education in Nigeria.

Keywords: Application, Artificial intelligence, Literacy, Education.

Introduction

In today's fast developing world, technology has come to take and maintain a central role in virtually all areas of human endeavours. This trend is ubiquitously due to the use of artificial intelligence (AI) which is a part of technology in building machines and systems that can think and learn in similar fashion like humans (Kalvium, 2024). AI has gained acceptability as a teaching tool among teachers and learners in recent time. Modern innovations such as digital assistants, facial detection and recognition (as in smartphones), Google Maps, spelling auto-correct sentence restructuring (such as Grammarly), language learning apps (e.g., Duolingo) and chatbots that is often used to order products online among others are ways society engage day-to-day with AI (Holmes et al., 2019).

Educational applications of AI are not going to take the place of teachers, however, it will only enhance their work as teaching aid that allow learners to learn more when compared with traditional teaching methods (Mohammed & Al-Ani, 2021; Ulyawati & Hotimah, 2023). According to Mohammed and Al-Ani (2021), applications of AI in education are essentially teaching aids that help teachers to teach and students to learn effectively.

Ruiz and Fusco (2023) defined AI as a branch of computer science with systems that use hardware, algorithms, and data to create 'intelligence' to do things like make decisions, discover patterns, and perform some sort of action. The algorithms in this definition are considered the "brains" of AI as they provide the rules for the actions to be taken, or in the case of machine learning, discover the rules (Ruiz and Fusco, 2023).

Russell and Norvig (2021) assert that AI is oriented to comprehend, model, and replicate human intelligence and cognitive processes into artificial systems. In practice, AI covers a wide range of subfields such as machine learning, perception, computer vision, natural language processing, knowledge representation and reasoning, among others (Russell & Norvig, 2021). In line with these assertions, AI is defined as the use of more than one bodily platform to increase the effectiveness of instruction.

In literacy education, AI is necessary as it provides easiness and facilities in education (Casal-Otero et al., 2023). As a result of AI applications, students can learn novel information. As observed by Mayer (2001), students can gain the knowledge and information that would be impossible to get in traditional ways. Hence, it evident that AI applications are aimed at helping students with different skills and learning styles.

AI applications in education can be liken to printed text books and other teaching materials, nonetheless, they consist of a number of sources. The significance of AI applications for educational purposes is well-recognized by the universities, school, government and private organization (AIED Proceedings, 2023). Although AI applications in education has been a subject or research over the years, their place in the classroom has only been recognized recently as a useful tool that is accessible to educators and students (Casal-Otero et al., 2023). Nowadays, AI applications in education are recognized by stakeholder as transformative tools that can revolutionize the process of teaching and learning. In the light of this, applying AI in literacy education in Nigeria is examined.

Literacy Education in Nigeria

Literacy education is concerned with the ability to read and write, be informed and to digest information received and to communicate effectively (Harrison, 2017). It is also the base of all human knowledge and wisdom and the means by which these are transmitted to others (Harrison, 2017). It is an obvious fact that education is the best legacy any nation can give its citizen that guarantees national development and in doing so, today's high tech applications must be in view. This is because new technologies such as AI are integral tools to effective teaching and learning (Mayer, 2001).

Literacy encompasses reading and writing skills development, advancement of the skills that precede the aptitude to comprehend spoken words and decipher written words, and ends in the deep understanding of a piece of writing (Mangywat and Meshak, 2022). It follows invariably, that the success of literacy development demands the teaching and learning of reading and writing skills become a national crusade. This can be attained by the government through relevant agencies, budgetary provision and school curriculum, thereby ensuring mass literacy.

In Nigeria, the goal of education is development and to achieve this central goal as a nation, literacy is pertinent as a vehicle of attainment (Mangywat and Meshak, 2022). Hence, without literacy, Nigerians will not read and comprehend the outlined goals in the National Policy of Education (FRN, 2013), namely:

- i. a free and democratic society;
- ii. a just and egalitarian society;
- iii. a united, strong and self-reliant nation;
- iv. a great and dynamic society; and
- v. a land full of bright opportunities for all citizens.

The Nigerian Government oversees the implementation of the aforementioned national goals through the participation of stakeholders in both public and private school systems. This is largely due to the fact that the government aims to ensure comparability with global best practices in literacy education. However, this is not the reality on ground as most publicly owned schools have nothing to offer the teaming population thereby leaving just a hand full private schools to deliver quality literacy education.

Challenges to Literacy Education in Nigeria

It is an obvious fact that literacy education has not been effective in Nigeria. According to Nwaubani (2004), professional qualification of caregivers/teachers, resources, staff-child ratio and funding etc are the central challenges has bewildered literacy education in Nigeria.

- **Teacher Development:** The output of teachers is a function of their educational preparation. This will greatly impact on their professional output in the discharge of their teaching assignments. Owing to the few qualified teachers in the job market, what is obtainable in most schools today are unqualified teachers who instruct without professional exposure to the methods and ways of teaching learners for their educational development.
- **Resources:** Resources generally determine quality and this holds true in teaching. The availability of resources for any educational programme would determine the capacity of school systems to implement that type of educational programme (Chukwbikem, 2013). The dearth of resources across public schools has impeded on the successful implementation of most of the educational programmes suitable for transmitting literacy education in Nigeria.

- **Teacher-Learner Ratio:** According to Obiweluozor (2015), in order to have an effective learning, the teacher to pupil ratio is 1:25. However, this is not the case in most public schools in Nigeria as most often, the classes are overstitched with large number of learners (Ejem et al., 2018). This creates an enormous amount of stress for the teacher culminating to less attention to the students. The learners on their part are distracted and opened to lack of concentration.
- **Funding:** Funding is the backbone of quality resource provision that drives teaching and learning. Lack of funding has resulted in the drop in morale of teachers and this in turn, has resulted in teaching without passion. Evidently, literacy education is underfunded in Nigeria.

Literacy Education Development in Nigeria

According to Oghenekohwo and Frank-Oputu (2017) literacy is the heart of sustainable development, which is the catalyst for social change and empowerment. Additionally, literacy is one of the major drivers in reduction of poverty, employment opportunities promotion, advancement of gender equality, improvement of family health, protection of the environment, and promotion of core democratic values (Mangvwat and Meshak, 2022). Evidently, literacy is pertinent to the realization of societal development.

Benefits of AI Applications in Literacy Education

The benefits of AI applications in literacy education are numerous as it increases effectiveness in teaching and learning. The environment created by AI applications in literacy education invariably influences the way teachers teach and how learners learn. Some of the benefits of multimedia technologies in early childhood education include:

- i. **Enhanced Reading:** the application of AI and related technologies is aimed at boosting learning how to read. This is due to the fact that AI application can help with word pronunciation as well help in identifying syllabus in word. This aids reading and learning is enhanced by making learners learn with fun thereby attaining great heights of excellence in what is taught. AI applications enable learner increase their memory of content and foster deeper learning when compared to traditional teaching ways that use by teachers (Cairncross & Mannion, 2001).
- ii. **Writing:** AI tools like ChatGPT or Grammarly have entered the classroom and help in creating good writing. Grammar can be checked for errors and words are properly aligned. Smart classroom today employs these AI tools in the teaching and learning process (Caukin et al., 2023).
- iii. **Flexibility:** The leaning interface created by AI technologies can be used both at school and home. This flexibility helps the learners in touch with the same experience both at school and home.
- iv. **Problem-Solving Oriented:** The overall objective AI technologies in literacy education is the provision of a learning platform that is problem-solving oriented. The system is designed present

real life situation in simple form. For instance, video simulations aids learning by enhancing learning-by-viewing and as such giving a problem-solving approach to learning.

- v. **Uniform Distribution of Learning Experience:** AI applications enable uniform distribution of learning experience for all learners at the same pace. This is possible as learners learn the same principles and skills simultaneously. In presenting contents through AI applications in literacy childhood, the contents are tailored with information that meet the need of specific individual because it can be presented in different ways to engage students with different learning styles and strengths (Cairncross & Mannion, 2001).

Employing Literacy Education in Nigeria through AI Applications

AI applications can be utilized to boost literacy education in the school system across the country. AI application provide innovative approaches to teaching and learning that address the challenges of traditional teaching method currently being used by schools in Nigeria. AI applications helps in the delivery of key subjects that are difficult to teach without teaching aid. Moreover, AI applications create a game like experience while learning is going on and help to stand in where teacher explanation is required since all parts of the teaching materials have been designed with relevant examples and stored in the system to accessed by the learner at all time.

Chen (2023) opined that teachers can leverage AI for effective planning, execution, and evaluation of their teaching methods. This is because it aids in identifying learners' needs, allowing tailored learning content and activities. AI enhances real-time monitoring and prompt feedback for teachers (Mangywat and Meshak, 2022). Moreover, AI can be used to support educators' learning, keeping them up to date in their disciplines (Celik, et.al. 2022; Chen, 2023). Some ways AI can be employed in education include:

- **AI as a Teacher's Assistant:** Teachers can leverage on AI to administrate in tasks such as creating emails, memos, and proposals; time management and smart scheduling; and setting and tracking goals (Rampton, 2023). Mollick and Mollick (2023) identified a number of generative AI tools, namely, Bing AI, ChatGPT, Dall-E2 (for creating images and art), GitHub CoPilot (an AI programer), Google Bard (a conversational AI tool), Scribe, Wordtune and Speechify (text to speech read out loud). These tools assist with class planning, scheduling, and managing administrative work, thereby allowing teachers to focus more on teaching (Maddux et al., 2001).
- **AI for Assessment:** As observed by Caukin et al. (2023), AI can be used to create differentiated assessments by providing lower Lexile levels in reading passages, simplifying verb tenses, and providing a glossary of terms. Tiered instruction and assessment questions, assignments, and rubrics can all be created using AI. Additionally, following instruction, AI-driven automated scoring systems can assist with grading assessments, ultimately

streamlining teachers' workload and enabling them to focus on crucial aspects like timely intervention and assessment (Nieves, 2023).

- **AI for Personalized Learning and Differentiated Instruction:** One of the major challenge teachers encounter is accommodating the diverse needs, abilities, and interests of their students. Hence, a significant merit of AI in education is its ability to tailor learning experiences to individual student's needs because it can predict how people will learn (Meehir, 2023). AI algorithms are utilized in adaptive learning platforms to assess students' strengths, weaknesses, and learning preferences thereby allowing them to progress through content at their individual pace (Frontier, 2023). Personalized learning materials such as worksheets, reading lists, and interactive exercises that align with each student's learning preference can be also generated with AI applications. They can assist a teacher for instance, in explaining a complex concept by breaking down the concept, altering the Lexile level of text, and suggesting different approaches (Caukin et al., 2023).

Risks Associated with AI Applications in Literacy Education

Although AI applications offer an array of benefits and opportunities for teachers and learners alike, it has associated risks. For instance, they can reinforce bias, creating "hallucinations" due to limited training data; and risky security issues (Caukin et al., 2023). This stems from the fact that the training data used for generative AI is based on English text from Western culture, and these systems are created by humans, unconscious bias can enter machine learning models and become automated and perpetuated (Marr, 2022). As a result, AI can reinforce existing biases and inequalities by not being reflective of the diversity in classrooms (Caukin et al., 2023). These are evident in image creation tools, inappropriate facial recognition, and biased assessment of student performance (Chen, 2023; Marr, 2022).

Conclusion

The study concludes that students learn effectively through the combination of texts, images, videos, animation and the like. Furthermore, results show that the assimilation rate of students is increased when they are taught employing AI applications than traditional methods of instruction. This helps to develop all their learning faculties which in turn increasing effectiveness. Based on these results, it was therefore recommended among others AI applications in teaching be encouraged in other to ensure that progress is made in presentations of concepts through demonstration, thereby boosting interaction while learning. Stakeholders and policy makers can check the benefits associated with AI applications in literacy education in comparison with its demerits. This is very important for adequate information that will help chart the way forward as it relates the use of AI applications in literacy education.

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