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## Artificial Intelligence (AI): A New Dimension in Literacy Education Development for Economic Transformation in Nigeria

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**ABSTRACT:** The world today is witnessing tremendous development in the area of technology. The extent to which people perceive and are actually sensitized to these changes depend on their level of education. Thus, the role of literacy education in the area of economic development of Nigeria cannot be overemphasized. To make full use of today's opportunities in the area of literacy education development, the facilitators and learners need more skills. These skills must be acquired through one of the modern-day technologies; Artificial intelligence (AI). This paper therefore examined Artificial intelligence (AI) skills that will benefit the tutors and adult learners, literacy education, use of AI for literacy education development, literacy education: implication for economic transformation. The paper showcases some of the obstacles facing the utilization of AI in literacy education as a vehicle for national transformation and recommended possible solutions to the identified problems. It concludes that the application of one of the emerging technologies of the 21<sup>st</sup> century (AI) that is cost effective, has the potential to bring ease way to literacy delivery is needed to give way to pragmatic solutions to literacy education and economic transformation in Nigeria. It is recommended among others that there should be training and retraining sessions for facilitators in literacy programmes to familiarize them with the AI tools and how to integrate them effectively and to ensure that tutors make use of AIs capabilities confidently.

**KEYWORDS:** Artificial Intelligence, Literacy Education, Literacy Development, Economic Transformation.

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### INTRODUCTION

Education develops skills and abilities, corrects some of the inequalities that come from marginalization, and decrease risk and vulnerability. Education sector associated with highly dynamic business environments which are controlled and maintained by information systems, is needed to move with time (Adamu, 2021). There is no doubt the fact that technologies are increasingly considered as the critical factor in widening participation in learning process, recent technological advancements and the increasing pace of adopting modern technologies constitutes a need regarding the development of literacy education. However, the level of literacy determines the extent to which the society develops among the comity of nations. The economic growth of a society is measured along the level of gross domestic product (GDP) the higher the gross domestic product, the higher the economic growth as well as the development of the society (Okemakinde,2020).

Literacy education provides continuity in education. The dropped-out ones are opportune to 'drop-in'. Also, those who are on the job have the opportunity to develop their skills; it assists an adult to pass through different stages of life, in every stage; it is a kind of educational programmes that stands to qualify him better to explore his life. It is indispensable for economic growth and advancement of any nation. Literacy to Biao (2015), is both a tool and process; it is a tool for communication, but it is a process of acquiring such skills that make communication orderly, intelligible and intelligent. It gives adult the skills they need to survive and thrive, opening the door to jobs, resources, and everything else that they need to live full and lives a better life and equip adult learners with required knowledge, skills, attitude and understanding of the economy for gainful employment towards self-reliance and national development.

There is no doubt the fact that Nigeria presently is faced with the problem of high level of unemployment, poverty and so on, which could lead to deprivation and underdevelopment. World Bank (2024) stated that Nigeria's poverty rate is around 40.7% by the end of 2024. This mean that more than 100 million Nigerian is living in poverty. Some of the reasons that led to this includes: inflation rate of 24.7 due to rising cost of food and energy, fuel subsidy removal by federal government in 2023, naira devaluation, limited job opportunities, limited access to services, insecurity and violence in the country just to mention but a few. According to the report, if all children in low-income in the country had just basic reading skills, an estimated 171 million people could escape the cycle of poverty. And if all adults completed secondary schools' education; we could cut the Global poverty rate by more than half. Unfortunately, there is no way a nation can developed without its citizens acquiring necessary skills, values, competences and techniques for operation of modern technology that can enhance economic production and productivity.

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According to Ugwu & Umezuruike (2023), semi-literate adults lack even the most basic of technology skills, let alone have the literacy proficiency necessary to realize the internet's potential. They further stated that it is therefore necessary to expand the idea of literacy to include technology-based skills and abilities that will ensure that adult learners can function adequately in the present technology-driven and globalized world. Okemakinde (2016), stated that to be literate in this modern day's standards is to be equipped with the skills of one of the modern-day technologies.

One of the modern-day technologies is Artificial intelligence (AI). AI is about equipping machines with the ability to perform tasks that mimic human intelligence, such as thinking critically and acquiring knowledge. It has the potential to play a transformative role in achieving; personalized learning pathways, real-time feedback mechanisms, and innovative teaching methodologies in literacy education. It is the ability of a machine to display human-like capacities such as reasoning, learning, planning and creativity. It enables technical systems to perceive their environment, deal with what they perceive, solve problems and act to achieve a specific goal (Chen, Chen & Lin, 2020 and Alharbi, 2023).

Transformation refers to a complete change in the appearance or character of somebody or thing for the better. A total departure from the old order to a new one, it does not come accidentally, but through a deliberate effort of application of skills acquired. AI can cater for diverse learning needs and ensure that no adult learner is left behind in literacy programmes. According to Oyebamiji (2006), when literacy skills are properly developed, they could respond to recent economic, political and social transformation including globalization and advancement of information and communication technologies. Adult learners would be able to apply the knowledge and skills effectively in solving and interpreting problems in a variety of situations. This paper therefore present AI (if well applied in literacy programmes) as capable of impacting the needed skills and knowledge to the facilitators, learners and can assist in developing literacy education for economic transformation in Nigeria.

### **ARTIFICIAL INTELLIGENCE**

The idea of artificial intelligence (AI) can be traced to thousand years ago to ancient philosophers considering questions of life and death. In ancient times, investors, made things called 'automatons' which were mechanical and moved independently of human intervention. Although Alan Turing published a book titled 'Computer Machinery and Intelligence' in 1950, which proposed a test of machine intelligence called the Imitation Game. However, John McCarthy, an American Computer Scientist is usually acknowledged as the person who invented AI because the term was coined by him (Glover, 2024).

To Celik, (2023), Artificial intelligence (AI) is the intelligence displayed by machine, especially computer systems. Some examples of AI applications include: Digital assistants, search engines, social medial, online shopping, Robots, transportation and navigation, text editing and autocorrect, fraud prevention and so on. It is a field of science concerned with building computers and machines that can reason, learn, and act in such a way that would normally require human intelligence or that involve data whose scale exceed what humans can analyse.

AI is also the ability of a machine to display human-like capacities such as reasoning, learning, planning and creativity. It enables technical systems to perceive their environment, deal with what they perceive, solve problems and act to achieve a specific goal. It is an asset of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand and translate spoken and written language, analyse data, make recommendations and so on. In essence, it is about equipping machines with the ability to perform tasks that mimic human intelligence, such as thinking critically and acquiring knowledge. It makes it possible for machines to learn from experience, adjust to new inputs and perform human tasks and a way of designing a system capable of thinking for itself just like humans do. It concerns automated grading which simulates the behavior of a facilitator to assign grades to the answer sheets submitted by the learners. It can assess their knowledge by processing and analyzing their answers, giving feedback and recommending personalized teaching plans. Feedback loops for tutors, aided by machine learning and natural language processing techniques, improves the quality of learner evaluations (Ayoub, 2020 and Antonenko & Abramowitz, 2023).

Personalized learning (PL) is one of examples of AI applications in the education sector. It refers to a variety of educational programmes in which the pace of learning and the instructional approach are customized and eventually optimized for the needs of each learner (Mohd & Shahboding, 2015). It is the ability to provide learners with adaptive learning opportunities; it can be used to provide customized, appropriate content and exercises. In particular, the content is tailored to the learning preferences and specific interests of each learner.

Adaptive learning (AL) like the traditional model of classroom education, continues to be very much one-size-fit-all, on the contrary, AI-powered AL systems are designed to optimized learning efficiency. An AI-powered anti-cheating system is another application of AI in the education sector. Proctoring is software which secures the authenticity of the test taker and prevents him/her from cheating as a proctor is always present during the test (Sandeem, 2013)

### **Advantages of AI**

AI can perform many tasks among which are:

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**Consistency** – it can perform tasks consistently, without making errors due to emotional distractions or bias.

**High-precision operations** – AI systems can perform high-precision operations, such as medical diagnosis, with a level of accuracy beyond what most humans are capable of.

In a nut shell, AI provides numerous benefits such as reducing errors, time saving capacities, digital assistance and unbiased decisions. It is a tool that can help us achieve our goals, but we need to ensure that we use it responsibly and ethically. It should be noted however, that AI is not a replacement for human intelligence because AI systems require human input and oversight to perform appropriately and make decisions in ambiguous situations.

### **Disadvantages of AI**

The disadvantages of AI include: emotional intelligence, encouraging human laziness, and job displacement, privacy and data security concerns. Larbi - Apan, Sampong & Kwofe (2020), mentioned factors such as poor network security, inadequate wireless technologies and low speed internet bandwidths, as well as ineffective infrastructure management as some of the disadvantages of AI.

### **Literacy Education**

Literacy education is no more about the 3Rs (reading, writing and arithmetic), but instead, about providing individuals with the capabilities for understanding their lives as well as equipping them with problem-solving skills. It is the key to socio-economic, personal and community development.

Importance of literacy education is numerous to catalogue among them include but no limited to the following:

- Provision of knowledge and skills without necessarily going through formal learning.
- Provision of better quality of lives through problem-self-solution
- As a means of developing the community through grassroots level participation by the individuals in the community.
- As a way by which workers can effectively and functionally improve.
- To give the adult citizens of the country the necessary aesthetic, cultural and civic education for public enlightenment.
- More than other forms or types of education, literacy education also caters for certain target groups in the society. For example, nomads, prisoners, workers, and so on (Okemakinde, 2020).

### **Use of AI for Literacy Education Development**

According to Mieczslaw, Agnieszka & Pawel (2021) intelligence technology is a method which uses knowledge to achieve concrete purpose in efficiency. To them, the following are the intelligence technologies: multi-agent, machine learning, ontology, semantic and knowledge grid, autonomic computing, cognitive informatics and neural computing. There is no doubt the fact that advances in these fields have already brought substantial changes in education, opening up new opportunities and challenges to teach and learn anytime and anywhere by providing new methods and systems that aim to stimulate innovative teaching and ultimately improve learning outcomes. Particular categories of AI can be combined in the final applications; some of them seem to be obligatory (knowledge, reasoning, processing) while others are employed for the specific solutions where knowledge should be permanently updated (machine learning).

Ugwu & Umezuruike (2023) quoting Adamu (2021) viewed some ways AI skills can improve literacy education:

- Managing information – utilization of AI will improve the skill to find, manage and store digital information and content of literacy education programmes.
- Communicating – improvement in the ability to communicate, interacts, collaborate, share and connect facilitator and learners together without stress.
- Transacting – there will be improvement in the ability of the adult learner skilled in AI to purchase and sell goods and services, organize finances, register for and use government service with ease, which will definitely reduce poverty level in the country.
- Problem solving – increases independence and confidence of adult learners in adult literacy programmes by solving problems using AI tools and finding solutions to individual learners problems in particular and the larger society at large.

AI is important in literacy delivery because it is beneficial to acquiring other competencies; gives access to teaching and learning resources; boasts learners engagement and collaboration classes without walls; makes learning materials attractive; gives access to content – creative tools; equips with skills abilities needed to cope in a globalized world; open up opportunity for better jobs; gives ample opportunities to self – learning and acquire new skills without a physical facilitator (Adelore, 2021). Utilization of AI in literacy education helps generate a personalized learning path for each learner, taking into account their prior knowledge, interests of goal. This is an improvement in the concept of andragogy as presented by Prof. Malcolm S. Knowles, he was a prolific American educator. Andragogy to Knowles (1978), is the method and practice of teaching adult learners. It is a methods and principles used in adult education. Andragogy may also be referred to as the arts and science of helping adult to learn. In essence, it is an approach to learning specifically focused on adult learners, emphasizing self-direction.

Knowles theory of andragogy is an attempt to develop a theory specifically for adult learning. Knowles emphasized that adults are self – directed and expect to take responsibility from decisions. To him, self-directed learning is a process in which individuals

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take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and materials resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. Adult learning programmes must accommodate this fundamental aspect. To him, andragogy makes the following assumptions about the design of learning:

- Adults need to know why they need to learn something
- Adult need to learn experimentally
- Adult approach learning as problem solving; and
- Adult learn best when the topics is of immediate value.

In practical terms, andragogy means that instruction for adult needs to focus more on the process and less on the content being taught. Strategies such as, case studies, role playing, stimulations, and self-evaluation are most useful. Instructors adopt a role of a tutor or resource rather than teacher.

Application of AI in literacy education will therefore provide opportunity for the instructor to decide what to teach, coach, manage and engage learner in the learning exercise and would allow the facilitator to find best content, links concepts to content, adjust based on content and learner success instead of finding contentment, edit content and respond to learners. On the part of the learner, AI will assist the learner to get learning plan just for the learner in question, skip concepts he/she knows, get recommendation, master all concepts instead of a situation where all learners get the same content, if a learner miss a concept, he/she is left behind, with the assumption that all learners are expected to move at the same pace. It can provide tools that will help the learner learn more easily; assist in fulfilling every adult's needs because it can adjust content based on individual accessibility requirement; It can facilitates (based on the learners level of proficiencies) an understanding that allows for an individualized instruction process that is optimized to help the learner achieve learning goals; It can help create course curricula targeting learner's interest goals and learning purposes; can offer those corresponding learning materials, projects, or experiences that match their ambitions; can generate customized learning for traditional subject areas and social emotional learning (Alharbi, 2023 and Celik, 2023).

AI offers the advantage of suggesting supplementary resources and enrichment activities that correspond with the learner's areas of interest as well as their learning curve; It can forecast future academic problems and potential remedial support by looking at previous performance, engagement levels, environmental factors, and many other data points; It can assist to change way by which the learners get guided academically, it can enable the learners virtually talk to their facilitator by giving them interactive problem-solving activities and adapting to their responses; It can also allow educators to specifically identify and support learner with certain academic difficulties. AI systems allow for detecting the areas where the learner might face difficulties (Clan, 2024). Integration of AI in literacy education has the potential to raise academic standards and improve the overall quality of education. It can then be used in creating content through engaging and interactive learning materials. It is a way of integrating AI into critical thinking curricula include the development of AI-driven literacy educational platform that a development to individual participant. According to Antonenko & Abramowitz, (2023) and Ozkan, (2024), AI can help ensure constituency and accuracy in grading, provide access to high quality resources and support educators in delivering effective instruction and makes it possible to have a classroom where lessons adjust to each learner's strengths and weaknesses. Through the application of AI in literacy programmes, facilitators can get real-feedback on how their adult learners learn while in the classroom. It can help to keep adult learners engage and motivated and can lead to improved academic performance.

In preparing lesson plan in literacy education through AI, there is the need for the facilitator to:

- Give information to the AI and ask it to create a plan based on this
- Give the AI the lesson aims and ask it to suggest activities
- Show the AI previous lesson plan already prepared and asks it to create a new plan using the old plan as template.

### Literacy Education: Implications for Economic Transformation

Literacy education prepare adult learners to fit into the world of work either as an employer of labour or employee which assist in solving the problem of unemployment in the country (Adedokun, 2015). Literacy education has a number of ways by which it can bring about economic transformation in the country. Some of them are outlined as follows:

**Transformation of adult learner:** the skills acquired through literacy education would allow the participant to imbibe the culture of developing a culture of strong mentality towards creating employment opportunities and instill the spirit of becoming job giver instead of job seeker.

**Creation of employment opportunities:** the acquisition of skills through literacy education equips adults with the necessary knowledge and ability to engage in income-generating activities. It would offer them the opportunities of having their small businesses and as small businesses grow, the more employment opportunities in the country.

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**Reduction in the unemployment rate:** acquisition of literacy education by adults expands the range of employment opportunities available to them. It would not only create jobs for themselves but also create jobs for other people thereby reducing the unemployment rate in the country.

**Economic prosperity:** literacy education equips its participant with appropriate skills to establish and run their businesses successfully rather than waiting for white collar job. Thus, creating job for themselves and others. The economic status of adult participants will definitely improve and his standard of living and his family will directly or indirectly be enhanced.

**Poverty alleviation:** poverty can be referred to as inability to meet the basic needs of life such as food, shelter, clothing and education. There is no doubt the fact that the level of poverty in Nigeria today is very high, acquisition of literacy education therefore will reduce the level of poverty in the country by creating a job opportunity by engaging in income generating activities through establishment of their own small businesses and thereby creating their own wealth.

**Reduction of societal socio-economic problems:** implementation of the skills acquired through literacy education may not allow adults to be engaged in violence, stealing, crime, prostitution, street roaming and so on caused by idleness among youths and adults.

In essence, literacy education has tremendous impact on the economic well-being of the citizen of the country, especially the adult learners who participated in the programme.

### **Challenges of utilization of AI in literacy programmes**

Some of the challenges associated with the use of AI in literacy education programmes include but not limited to the following:

**Technical expertise:** majority of facilitators and adult learners may lack the necessary skills, support, and technologies to use AI in literacy education programmes. Some of them may struggle with a lack of technical expertise, spending an excessive amount of time and efforts trying to adapt AI tools.

**Lack of basic technological infrastructure in literacy centres:** one of the biggest challenges in the utilization of AI in literacy education is the lack of technologies essential for implementation of AI in literacy classes.

**Cost:** implementation of AI- powered solution can be financially demanding, making it a challenge for National Commission for Mass literacy, Adult and Non-Formal Education (NMEC) with budget constraints.

**Ethical Concerns:** Privacy, security, plagiarism, inequity, and the potential disruption of the job market are among the ethical concerns that need careful consideration when integrating AI in literacy education

**Quality control:** maintaining high standard and ensuring aligns with educational objectives is critical. An over reliance on AI tools may lead to a decline in quality and richness of literacy educational content.

## **CONCLUSION**

Utilization of AI in literacy education offers numerous advantages, including personalized learning experiences, increased efficiency, and enhanced learner support and engagement. The lip service paid to reduction/eradication of illiteracy and poverty in the country must therefore give way to pragmatic solutions. This solution may not be sustainable except for the application of one of the emerging technologies of the 21<sup>st</sup> century, artificial intelligence (AI) that is cost effective, has the potential to bring ease way to literacy delivery in Nigeria. This paper therefore, emphasizes AI as a vehicle for literacy education development and established the fact that there is relationship between, literacy education and economic transformation, utilization and well implementation of AI in literacy education will improve the living standard of participants of literacy education in the country.

## **RECOMMENDATIONS**

Based on the challenges that utilization of AI might pose in literacy education delivery in Nigeria, the following recommendations were offered:

There is the need for National Commission for Mass Literacy, Adult and Non-Formal Education (NMEC) to make a difference by changing the paradigm of its delivery from numeracy and literacy, to digital literacy.

Government at all levels of educational system should invest in radical capacity building of its work force in AI technology in literacy education programmes in the country.

There should be training and retraining sessions for facilitators in literacy programmes to familiarize them with the AI tools and how to integrate them effectively. Frequent training session is essential to ensure that tutors can make use of AIs capabilities confidently.

There is the need to provide clear and accurate information about the issue of learner privacy and data security by implementing robust privacy policies and security measures to stakeholders to build trust.

NMEC should involve stakeholders in decision making: include facilitators, adult learners, and administrators in decision making process regarding the implementation of AI tools. This collaboration approach can help address concerns and ensure buy-in from all stakeholders.



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