

THE COUNTERPRODUCTIVITY OR OTHERWISE OF ARTIFICIAL INTELLIGENCE (AI) FOR ATTAINING QUALITY EDUCATION IN 21ST CENTURY AFRICA

Ogabo, Godwin Adinya, PhD

St. Albert Institute, Fayit, Fadan Kagoma, Kaduna
State

domgodwins@gmail.com

&

Amoke, Paul Akwagiobe, PhD

Department of Philosophy, Ebonyi State University,
Abakaliki

frpaulamoke@gmail.com

Abstract

Issues about Artificial Intelligence have taken centre stage in contemporary society due to the monumental impact of AI on human society. No doubt, the impact of Artificial Intelligence in 21st century society cannot be overemphasized. From economy to information and communication; from technology to security, and virtually every sphere of life has been affected by AI. One area that has witnessed the highest influence of AI is the educational sector. However, many thinkers are curious about the place of AI in the attainment of quality education, especially in Africa and other developing parts of the world. This paper examined the productivity or counterproductivity of Artificial Intelligence (AI) in attaining quality education in Africa. The study employs the qualitative research design. Data were gathered from secondary sources such as books, journals, academic papers and the internet. The

data was analysed with the expository and evaluative tools. The paper found out among other things that AI has a high tendency to raise the quality and standard of education in 21st century Africa. However, there are notable fears from some scholars that AI could take the place of teachers in the educational arena, water down the culture of hard work, among other setbacks. This study contends that the AI can be properly managed and channeled towards enhancing quality education in Africa. In the final analysis, if the various challenges surrounding the use of AI in education in 21st century Africa are surmounted, then education would assume a qualitative status.

Introduction

The popularity and centrality of Artificial Intelligence (AI) in contemporary society is overwhelming. Modern evolution and developments in Artificial Intelligence (AI) have attracted both academic and public attention to a deeper analysis and efforts at understanding its prospect to transform human societies, its disruptive impact on a range of activities and the challenges that hinder its functionality. In various African countries, it is evident that efforts for quality education have faced multiple constraints. This is why over the years the quality of education has continued to dwindle due to multifaceted factors. Considering the continual dwindling of the educational sector in Africa, it has become pertinent to turn to Artificial Intelligence (AI) as a crucial ally. One would ordinarily expect that AI holds the

potential to help mitigate quality gaps in an otherwise resource-constrained educational environment. This is borne out of the fact that the advent and development of AI has revolutionized many traditional educational models and concepts by enhancing their quality. However, despite the enormous benefits of AI to the development of education, it is feared to be counterproductive in African societies.

This paper makes the argument that despite the apprehensions of AI as counterproductive for quality education in Africa, contemporary education in Africa can no longer be qualitative without being AI competent and compliant. This study suggests that quality education delivery in Africa should be made appropriately AI-driven in order to increase the efficiency and effectiveness of delivery. The study submits that even though AI tends to water down education if not properly harnessed, it is also capable of providing new perspectives for education if properly harnessed. Apart from enhancing greater efficiency, it has the capacity to ease educational delivery across the society.

Conceptualizing Artificial Intelligence

There is no univocal definition of AI. Rather, many thinkers have defined AI in different ways. The notion of Intelligence could be defined as the “ability to learn and perform suitable techniques to solve problems and achieve goals, appropriate to the

context in an uncertain, ever-varying world” (qtd. in Manning 1). The phrase ‘*Artificial Intelligence*’ (AI) was coined by emeritus Stanford Professor John McCarthy in 1955. He defined AI as “the science and engineering of making intelligent machines” (Manning 1). AI refers to the capacity of machines to perform specific roles and tasks currently performed by humans within the workplace and society in general (Singh 744). AI is a collection of information and communication technologies (ICTs) that mimic human intelligence to enable machines to facilitate our jobs better, create greater efficiencies and drive socio-economic growth.

AI generally involves various processes such as autonomous systems, machine learning, supervised learning, deep learning, algorithm, narrow AI and human centered AI.

- **Autonomous systems** are built to separately plan and decide sequences of steps to achieve a specified goal without micro-management.
- **With Machine Learning (ML)**, AI studies how computer agents can improve their perception, knowledge, thinking, or actions based on experience or data. ML draws from computer science, statistics, psychology, neuroscience, economics and control theory (Barnes 32).
- **Supervised Learning** involves a computer learning to predict human-given labels, such as bird breed based on labeled bird pictures.

- **Deep Learning** involves the use of huge multi-layer (**usually artificial**) **neural networks** that compute with continuous (real number) representations, a little like the hierarchically organized neurons in human brains (Schwab 33).
- **Algorithms** identify the precise steps to take, such as a person writes in a computer program. AI systems contain algorithms, but often just for a few parts like a learning or reward calculation method.
- **Narrow AI** refers to intelligent systems for one particular thing, e.g., for **speech, sight or facial recognition**.
- **Human-Centered Artificial Intelligence** refers to AI that seeks to supplement the abilities of human beings as well as address the societal needs and draw inspiration from human beings. It researches and builds effective partners and tools for people, such as a robot helper and companion for the elderly (Kok et al 74).

History of AI: Inquiring the African Origins

Noticeably, many commentators attribute the mainstream history of AI technology to the West and East. They do not indicate any link between the history of AI and Africa. However, Adams avers that such scholars “only attribute the lack of a connection of the history of AI and Africa to the erasure of the relevant African history” (72). In other words,

colonizers and early European visitors violently erased or truncated the dreams and civilizations on AI from history. However, upon deeper inquiry, “there is a strong possibility that the West and East borrowed and absorbed lore from Africa, thus incorporating African stories into Western and Eastern historical narratives” (75). Ancient African knowledge system narrates the primordial evolution of AI in many African societies. Evidence of this could be documented.

From the African sphere, Adams reports that since about 12,000 years ago, the Yoruba people of Nigeria in West Africa have worshipped Ogun, a primordial *orisha* of iron, technology, and creative intelligence. Further, through the power of their ancestors, the Yoruba people were able to inflict harm on their enemies through robot-like warrior spirits called *Shigidi*. Moreover, in 17th century Benin, the royal palaces were decorated with bronze automatons known as ‘the Benin Bronzes’ (12). Ogun’s worshipers recognise him for his metalwork skills. Moreover, the Ifa tradition, which is the central religious belief system of the Yoruba people, is based on binary code. Binary Code is a coding system using the numerical digits 0 and 1 to represent a letter, digit, or other character in a computer. In simple terms, it is the language of computers. Intriguingly, binary code also serves as the foundation of mainstream Computer Science (including AI research) (14).

Even current literature indicates that the ancient Greeks painted images of Nubian Africans in Greece from around the 14th century BCE. The research raises two critical points. First, Africans were in Greece almost 500 years before the first written accounts of AI. Secondly, there must have been some assimilation between African and Greek wisdom, which explains the similarities between the deities (Mayor 85).

Also, it seems too coincidental that the Ifa tradition, which is the central religious belief system of the Yoruba people, is based on binary code. Intriguingly, binary code also serves as the foundation of mainstream Computer Science (including AI research). Therefore, knowing that a tangible link exists between the first dreams of AI and Africa, it is highly likely that we were the original inspiration for the AI we have today.

The story goes that the Yoruba gods of western Nigeria once existed as humans and had their way of communicating. Prior to their disappearance, they left with the people a means to communicate with them in the outer realm (i.e. the ifa divination). Over 12,000 years ago, Africans developed Ifa Oracle divination based on the square of $16 = 16 \times 16 = 26 = 2^8$ corresponding to the vertices of an 8-dimensional hypercube and to the binary 2-choice Clifford algebra $C1(8)$ and so to related ones such

as $C1(8) \times C1(8) = C1(16)$. Since the number of sub-hypercubes in an 8-dimensional hypercube is $6,561 = 81 \times 81 = 3^8$, the Ifa Oracle has $N = 8$ ternary 3-structures well as binary 2-structure (Adams 1).

It was only later that similar wisdom arose in the Western and Eastern worlds. In the West, in 8th century BC, the ancient Greeks spoke of Hephaestus, the god of fire and metalwork. Hephaestus is believed to have created living metal automatons. In the East, Indian lore speaks of automaton warriors who protected Buddha's prized artefacts (Alamu, Aworinde and Isharufe 526). All these came after the African wisdom system.

The Relevance of AI for Quality Education in Africa

The relevance of AI in the delivery of quality education can never be overemphasized. Some of the areas in which AI is crucial to quality education in Africa include:

i. *AI can create an Educational Link to the World*

The main driving force for AI investment is to provide better and faster services in order to stay ahead of competition. The competitive strategy for the majority of academic institutions is to provide high quality services to their learners and to establish long term relationships to service partners. AI technology entails processes that make education a web of complicated processes that interplay with each other

in various places. Gyaneshwar avers that “with AI, it has been possible to globalize educational operations” (2235). Now, just about anyone can attain education practically anywhere, from any part of the world. AI technology has made it possible for education to have a wider reach in the world. The best example of this is learning done through the internet. The internet is now a crucial part of any educational encounter, as it enables the learners to engender a worldwide learning system.

ii. *It enhances Skills and Motivation*

AI has the potential to innovate, accelerate, enrich, and deepen skills in both teachers and learners; it has the capacity to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthen teaching and help schools change positively. AI in teaching and learning equally has the capacity of helping students to expand knowledge, experience and increase understanding, especially in areas that require visual, audio, maps, video presentation and so on. This means that using technology in lessons has positive impact on students' achievements (Plant 21).

iii. *AI improves Information Dissemination*

The popular saying that information gives power is always factual. As a result of AI, the previous, often primitive, ways of disseminating information could

richly be enhanced to a greater extent. With AI, acquiring information has gone electronic whereby one can reach every part of the world to source information from his local point. Elders (as in the African setting), teachers and books are no longer the only sources of information. Educational accessibility is now vast, whereby the most students could be seemingly more informed than their teachers. Thanks to the media (print and electronic) and most acknowledging, the internet (Brynjolfsson and MacAfee 47).

iv. *Enhancing Educational Administration*

AI has the prospect of providing the bedrock on which educational administration and management can be built. Providing a proper field of innovation in academic environments as well as creating development technology with local conditions is an advantage of AI. Apart from this, Attom points out that there is a significant benefit of technological investment on the growth and efficiency of education (21). That is why educational environments with large number of administrative applications readily support adoption of technology as a tool for management control, operational control and general administration.

v. *AI could be a Source of Support and Security to Educational Process*

According to Spector, AI enables educational institutions to automate numerous processes, which thereby increases their productivity. This is possible because it enables them to use fewer resources, thereby enabling them to improve on quality at a low cost and to improve the speed with which institutions can deliver outcomes. In the process, it has become possible to serve more people with less resources. It also makes it easy to store more information while maintaining the integrity of that information. With AI technology, “we are better able to store sensitive and confidential information in a way that makes it less vulnerable to a data breach” (Adewoye and Akanbi 2145). Equally, information can be retrieved instantly when needed, and it can be analyzed not only to study past trends but also to forecast the future. In turn, this can help with the decision-making process.

vi. AI Decreases Costs and Increases Utility

The academic world changed forever when computers were introduced onto the scene. Schools can utilize information technology through the use of computers and different software to run their operations in a smoother fashion. Asma identifies two main things that have come together to make what is called a “buyer’s market” possible (30). These are the fact that both hardware and software that are needed in creating the necessary software solutions have become more affordable and the fact that more and more entrepreneurs who are also tech-

savvy are appearing by the day to make use of these technologies. Thus, the costs of operation are generally reduced while utility level is improved.

Counterproductivity of AI for Quality Education in Africa

The benefits that could accrue from a proper management AI in education are enormous. Despite the huge benefits of AI for quality education in Africa, there are many barriers that hinder the utilization of AI in African education. The major issues include:

- a. Lack of Improvements with Experience: Unlike humans, AI does not have the propensity to learn from its own experiences and mistakes. This makes it stagnant without human intervention, especially in the educational sector.
- b. Complacency, laziness and over-dependence: AI in education has a high tendency to make students lazy and over-indulgent. It dampens the spirit of hard work in education.
- c. Lack of Emotion and creativity: AI does not have the capacity to apply emotions and creativity in decision-making. When making sensitive decisions, humans inherently consider emotional ramifications and considerations. This is lacking with the application of AI.
- d. Lack of necessary internal skills: this is a major barrier to the investment in technology, especially in the rural parts of Nigeria.

- e. Cost of Operation: the costs of purchase and implementation of AI gadgets are too high. Because of the high rate of poverty, many small educational institutions cannot afford the cost of procuring and sustaining the use of technologies (Prisecaru 59).
- f. Unavailability of relevant information and advice on suitable and effective technologies is also one of the major barriers.
- g. Poor Government regulations and requirements is also a major setback to the use of AI in education. In Nigeria for instance, the frequent ban on media outfits like the twitter, facebook and other social media regulations have often been challenges to the use of AI in educational delivery (Wilner 77).
- h. Poor communication Infrastructure: Since the advent of telecommunication in Nigeria, the pace of its progress has been slow, and the country has fallen behind most of its neighbors with regard to performance in this sector. "Telecommunication services in Nigeria are underdeveloped and provide one of the lowest rates of telephone ownership per 1,000 inhabitants in the world" (Plumb Lon 111). As most of the telephone service uses outdated analogue technology, the quality of telecommunication services is often poor and in need of upgrades. The problems are worsened by delays or nonexistence of

telecommunication networks in various parts of the country.

The Way Forward

It is obvious that the harnessing and use of AI to its maximum potential for educational delivery is a major boost to the development of quality education in Nigeria as in any society. In order to ease the integration of AI into education in Nigeria, the following steps are necessary: First, stakeholders in the education sector are encouraged to begin the use of technology on a small scale in order to reduce the fear of cost. Alam suggests that, “let your employees be on the same page with each other, using such things as collaboration platforms and social media to keep everyone updated about what is going on in the in the school and where it is headed. That way, they will be in sync with the goals of the school, and their productivity would be significantly improved” (122).

In addition, Government and relevant agencies ought to provide enabling environments for the enhancement of AI technology in the country. The government on its part, can initiate special incentive schemes such as tax holidays, free computers and other technology resources to encourage educational institutions to readily accept to use these resources to improve their teaching-learning activities This would require extending the networks to remotest areas as well as making legislations concerning technology

based on the positive outcomes rather than personal gains. There should be effective training programmes organized by government and non-governmental organizations (NGOs) that would ensure competencies in skills, knowledge of basic technology and proficiency in the school environment generally.

Furthermore, there is the need for proper information and public enlightenment towards the development and use of technology in various levels of education. Alam confirmed that technology requires acquisition of practical skills which must be properly communicated to the learners (88). With the changes in global market, office automation and democratization, it is inevitable for individuals to have the ability to access and apply information; such ability should have a root from conscious education. For Nigeria to keep pace with the global changes in her educational system, especially in content and mode of instruction, the younger generation should be geared to grapple with the challenges of technology as well as meeting the national educational goals. With the application of AI technology in education, the learners would be able to recognize what they need to accomplish, determine when and where to obtain the needed information.

In addition, periodic training in the form of workshops and sensitization programs on the benefits

and use of technology resources in education growth should be organized by stakeholders to create more awareness in order to enhance their preparedness to institute technology programs aimed at improving their educational operations. Here also, there should be a comprehensive effort to institute technological training programs at the various levels of the educational hierarchy. The study of basic technology should also be made compulsory at the basic and second cycle schools to train more students to increase technical trainees and professionals to fill the technology job market (Amankwah-Amoah 85). A special loan scheme should be initiated jointly by the government and the various commercial and investment banks to provide easy access to credit facilities that will absorb the initial high investment cost of implementing technology projects in schools.

Conclusion

From the discussion, it is obvious that AI has a high tendency to improve the quality of education in Africa. It is inevitable for the smooth running and development of education irrespective of size and complexity. However, it would be foolish to deny, that there are also threats to education delivery brought about by AI technology. Despite the good that AI brings, there are some ugly trends that must also be dealt with. These include over-dependence, malicious activities by individuals and organizations, such as hacking, pornography, and other cybercrimes. Because of this, it is important for educationists to

exercise responsibility when using AI to conduct educational delivery. It is worthwhile to contend that due to the rapid development of AI and its huge use in all spheres of our lives, religious education is also influenced by it. This means that AI needs to be properly harnessed and guided towards enhancing the quality of education in Africa.

Works Cited

- Adams, Nathan-Ross. "The Curious History of Artificial Intelligence An African Perspective". *Becoming Human: Artificial Intelligence Magazine*, Nov 1, 2019. Web.
- Adewoye, J.O. and Akanbi, T. A. "Role of Information and Communication Technology Investment on the Profitability of Small Medium Scale Industries –A Case of Sachet Water Companies in Oyo State, Nigeria." *Journal of Emerging Trends in Economics and Management Science*. Scholarlink Research Institute Journals (2012): 2141 – 7024. Print.
- Alam, M.J. "E-Governance in Bangladesh: Present Problems and Possible Suggestions for Future Development." *International Journal of Applied Information Systems (IJ AIS)*. 4. 8 (2012): 115-126. Print.
- Alamu, F. O., Aworinde, H.O. and Isharufe, W. I. "A Comparative Study on Ifa Divination and Computer Science". *International Journal of Innovative Technology and Research* 1. 6 (2013): 524–28. Print.

- Amankwah-Amoah, J. "Technological Revolution, Sustainability, and Development in Africa: Overview, Emerging Issues, and Challenges". *Sustainable Development*. 27. 5 (2019): 910-922. Print.
- Asma Moomal, Maslin Masrom. "ICT Development and its Impact on e-Business and HRM Strategies in the Organizations of Pakistan". *Journal of Advanced Management Science*. 3. 4 (2014): 22 - 34. Print.
- Attom, Ben Ebo. "The Impact of Information Communication Technology (ICT) on Business Growth Strategies of Small and Medium Scale Enterprises (SMEs) in the Awutu Senya East Municipality of Central Region of Ghana." *Asian Journal of Business and Management Sciences*. 3. 2 (2010): 13- 28. Print.
- Barnes, S. T. (ed) *Africa's Ogun: Old World and New*. Indiana: Indiana University Press, 1997. Print.
- Brynjolfsson, E. and MacAfee, A. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. London, New York: W. W. Norton & Company, 2014. Print.
- Gyaneshwar, Singh Kushwaha. "Competitive Advantage through Information and Communication Technology (ICT) Enabled Supply Chain Management Practices". *International Journal of Enterprise Computing*

- and Business Systems. 1. 2 (2011): 2230-8849. Print.
- Kanu, A. I., Addidi, T. & Kanu, C. C., "Artificial intelligence and cybercrime in Nigeria: Towards an Ethical framework". *Dialogue and Universalism*. 32(1) 143-158, 2024.
- Kanu, I. A. (2020). "Igwebuiké philosophy of science and technology". *Nnadiabube Journal of Education*. Vol. 5. No. 4, pp. 64-74.
- Kanu, I. A. and Ndubisi, J. O. E. (2022). "Artificial intelligence and socio-economic development in Africa". *OCHENDO: An African Journal of Innovative Studies*. Vol. 3. No. 1. pp. 2-21.
- Kok, J. N. et al. Artificial Intelligence: Definitions, Trends, Techniques, and Cases. Paris: UNESCO & Encyclopedia of Life Support Systems, 2009. Print.
- Manning, Christopher. "The Definitions of Artificial Intelligence". Stamford University Human-Centred Artificial Intelligence e. September 2020. AI-Definitions-HAI.pdf. Web.
- Mayor, A. *Gods and Robots Myths, Machines, and Ancient Dreams of Technology*. Princeton: Princeton University Press. Print.
- Plant, R. *An Introduction to Artificial Intelligence*. New York: American Institute of Aeronautics and Astronautics, 2012. Print.
- Plumb Lon, Zamfir Andreea. "Use Of ICT in SMEs Management Within the Sector of Services". *European Journal of Business and Management*. 3. 6 (2011): 102-112. Print.

- Prisecaru, P. "Challenges of the Fourth Industrial Revolution". *Knowledge Horizons – Economics*. 8.1 (2016): 57-62. Print.
- Schwab, K. *The Fourth Industrial Revolution*. New York: Crown Business, 2017. Print.
- Singh, J. A. "Artificial Intelligence and Global Health: Opportunities and Challenges". *Emerging Topics in Life Sciences*. 3, (2019): 741-746. Print.
- Spector, L. "Evolution of Artificial Intelligence". *Artificial Intelligence*. 170 (2006): 1251-1253. Print.
- Wilner, A. S. "Cybersecurity and its discontents: Artificial intelligence, the Internet of Things, and Digital Misinformation". *International Journal*. 73. 2 (2018): 308-316. Print.