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ADVENT OF ARTIFICIAL INTELLIGENCE: PROSPECTS AND CHALLENGES IN NIGERIA EDUCATION SYSTEM

BY

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ABSTRACT

The growing speed of Information and Communication Technology has paved way to more technological advancement which has opened up a novel subject matter named Artificial Intelligence (AI) in education. This paper focuses on advent of artificial intelligence: prospects and challenges in Nigeria education system. It is envisaged that Artificial Intelligence systems are becoming adopted and its application is racing fast in teaching and learning, hence, the need to look at highlights on achievements of Artificial Intelligence, benefits of Artificial Intelligence, challenges of Artificial Intelligence and the way-forward. In addition, suggestions made include that government should make deliberate and conscious effort to fund the project, involvement of teachers and students, training and retraining of teachers. These suggestions made if put into consideration will compliment and support teachers to combine human capabilities with artificial intelligence to bring about quality delivery in lifelong education.

KEYWORDS

Artificial Intelligence, Prospects, Challenges, Education.



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Introduction

The rate at which Information and Communication Technology has grown over the years is tremendous and it has opened up novel opportunities to teaching and learning in which artificial intelligence has become a trending subject in recent times. The emergence of artificial intelligence started in the 1950s in a two-month workshop organized by John McCarthy at Dartmouth college in the USA (Popenici& Kerr, 2017; Zawacki-Richter, Marin &Gouverneur, 2019). The word artificial intelligence was used for the first time in 1956 by John McCarthyHassani, Silva, Unger, TajMazinani, andMacFeely, (2020). Artificial Intelligence is a broad term that describes a range of technologies, machines, computers and methodologies such as language, data processing, neural network, machine language and algorithm. Russel and Norvig (2010) defined artificial intelligence as a machine that can imitate a concise and summarized idea. Popenici and Kerr (2017) defined artificial intelligence as a system that can do what human can do in terms of learning, use of data for different tasks, multitasking, synthesizing, analyzing and predictions. Baker and Smith (2019) defined artificial intelligence as computers that can perform mental assignments which relate to what humans do in education. Artificial Intelligence could also be referred to as the ability of a machine to imitate intelligent character or quality that helps a group of persons to function effectively and efficiently.

Zawacki-Richter, Marin and Gouverneur (2019) revealed that the USA, Chinese, Turkish and Taiwanese are the pace setters of artificial intelligence from computer science and STEM department. Also,(Popenici& Kerr, 2017; Zawacki-Richter, Marin &Gouverneur, 2019) reported that iPhones Siri started as an artificial intelligence project by the US Defense Advanced Research Project Agency (DARPA) in 2001 and became a company that was bought over by Apple Inc. Marr (2018) reported that there will be a rise in the use of artificial intelligence in education sector in the USA by 47% between 2017 and 2021. Studies (Evans, 2011; Hassani, Silva, Unger, TajMazinani, &MacFeely, 2020) revealed that Cisco forecast 50 billion electronic devices to be connected to the internet by 2020 which will produce a large amount of data. Zawacki-Richter et al, (2019) reported that artificial intelligence in teaching and learning is estimated to increase by 43% from 2018-2022. Popenici and Kerr (2017) reported that China is working towards becoming the world giant in artificial intelligence with a set of 150 billion artificial intelligence communities by 2030. The US Department of Defense has put in 2.5 billion US dollars in artificial intelligence in 2017. Also, Europe has over 1200 artificial intelligence start-ups and the European commission aims at enhancing total private and public assets in artificial intelligence to at least 20 billion euros at the end of 2020.Joshi, Rambola andChuri(2021) opined that 47% of total population in the USA is at risk of losing their jobs in which education sector has a high percentage due to use of computers. Individual assets in the US is over 20 billion US dollars per year.It is pertinent to know that artificial intelligence has been living with us for decades and humans are yet to maximize its potentials in a broad spectrum and in teaching and learning in particular (Zawacki-Richter et al, 2019).

From several studies, this has shown the perennial and perspectives of artificial intelligent over the years and its relevance in revolutionizing diverse aspect of sectors holistically. This study tends to lucidly look at the advent of AI on Nigeria educational system and how its elements move away from it parochial way of teaching and learning whilst integration of AIto the system amidst its benefit. AI is an advance technology that will foster innovation, initiatives, creativity, flexibility and sustainability into the system in order to bridge savvy gap. However, this study glance at the advent of artificial intelligence in Nigeria educational system, its prospect and challenges akin to integration into the system for improvement.

Purpose of the Study

The aim of this study is to contribute to the understanding of the advent of artificial intelligent, its perspective and challenges in Nigeria educational system, by postulating a framework that defines the construct and recognizing factors that influence its extension. Achieving this objective includes classifying and elucidating the elements in the component of artificial intelligent as well recognizing other relating factors from several literature review. Meanwhile, there are several artificial intelligent characteristics, but this research focused on its perspective and challenges in Nigeria educational system and also looked at existing empirical reviews.

Highlights of Achievements of Artificial Intelligence

In recent times, the use of artificial intelligence is progressively increasing and has incessantly received laudable audience in different fields such as in medicine, commerce, education, among others. In one-month of system development, researchers at Stanford made a huge success by using artificial intelligence to detect 14 different medical cases using view x-ray images above human analytical precision for pneumonia. Popenici& Kerr (2017) reported that in 2017, an artificial neural network system Alpha zero made in 24 hours an incredible level of play in the game of chess, go and shogi. Also, Google CEO SundarPichai drew attention when he dramatized in his speech, how an artificial intelligence computer can independently organize appointments on the phones. Even as Singh et al (2021)³, emphasized that when the Covid-19 pandemic forced all sectors to adopt flexible working styles, there has never been a time more significant than now where there is a new normal to understand the wonders that technology (AI) has to offer.

More of abundance of artificial intelligence machines in restaurants, business centers, self-driving cars, supermarkets and talking robots. It is scaring to think that artificial intelligence is displacing humans in many areas. It is note-worthy to know that artificial intelligence systems are much more limited and doubtfully would not replace teachers (Joshi, Rambola&Churi2021). Artificial Intelligence systems have scientific, technical, personal and cultural discriminations.

Benefits of Artificial Intelligence in Education

Artificial Intelligence is an embodiment of Information and Communication Technology gadgets that make work effective and efficient with the aim of adding value to life. According to Zawacki-Richter et al, (2019); Joshi et al, (2021), some of the benefits of artificial intelligence in education includes

1. Artificial Intelligence system has the capability of monitoring students' work, performance and learning progress.
2. It prompts feedback, creates platforms for individualized learning, special education for special learners, acts as interface between teachers and learners and enables learners to access and get global information that will accelerate teaching and learning.
3. It helps to assess teachers and learners' work, marking of scripts with speed and accuracy, decodes teachers slides to language of choice of learners, reduces manual workload and stress.
4. It encourages group learning, collaborative learning, saves time and enhances teachers' performance which ensures efficiency and higher quality delivery in education.
5. Artificial Intelligence supports and empowers learners with science skills, science attitudes, entrepreneurial skills, initiative and creativity that accelerate lifelong education.

There are many benefits to incorporating AI in Nigeria educational system, as it is preferred in information dissemination and seen as a fair option for fast learning from one location or region to another, it's cost-efficient, neutral and impartial, providing to the parties the teachers and student to learn in a specific field and giving them certain control over the procedure, which is not their curriculum. It also permits sharing of ideas and creativity to all parties involved both in learning and teaching. Nonetheless, Integrating AI proficiencies into Nigeria educational system brings countless benefits to teachers and students comparably, it will enable a modified academic path, improved results and enhanced prepared individuals. The emphasis on teaching and learning prospects in the application of AI in Nigeria educational system is paramount with enhancing learning and teaching experience obtainable.

Challenges of Artificial Intelligence

Some of the challenges that are inherent in the adoption of the use of Artificial Intelligence include addition and implementation of artificial intelligence program policy, teachers' attitude towards artificial intelligence, students' attitude towards artificial intelligence, preparing teachers towards artificial intelligence movement, cost implication of acquiring artificial intelligence gadgets, infringement of right and enhancement of teaching and learning through addition of games.

Also technological savvy among teachers and students in the Nigeria educational system, most teachers are obsolete and lack technical know-how to operate AI tools. Not updating themselves with the latest tech, skills and approach to teaching and learning makes it difficult and delays the implementation and use of AI in Nigeria educational system, hence delivering the potential of positive AI will require preparedness and foundational knowledge, which constitute part of easy process. As Ayoub(2020) opined and expresses that educators see AI as helpful to their institution's competitiveness, yet most institutions still lack a formal data tactic to advance the learning and usage of AI.

Addition and Implementation of Artificial Intelligence Program Policy

Addition of artificial intelligence program to National Policy on Education is not a worry but the implementation of the policy. Jegede & Owolabi(as cited in Cleopas, 2020) asserted that a broad interval exists between policy statement documented and its implementation. Implementation of policies in education has been a pivotal issue in Nigeria in particular over the years. Many agreements reached by Federal Government and stakeholders in education are not fully met as in the case of Academic Staff Union of Universities (ASUU), Non-Academic Staff Union (NASU) and National Union of Teachers (NUT). This act of government has led to incessant strike by the education communities and has reduced quality of education nationally and internationally. If the Nigerian government shows similar attitude as aforetime to this program, then Nigeria will be backwards in technological advancement in this age.

Teachers' Attitude towards Artificial Intelligence

Teachers have major roles to play in the effectiveness and efficiency in the use of artificial intelligence. It is envisaged that there is an on-going fear in teachers to be displaced by artificial intelligence in the future. Stone, Brooks, Brynjofsson, Calo, Etzioni, Hager and Leyton-Brown, (2016) reported that teachers feel threatened due to risk of losing jobs because of smart machines called robots. There is a possibility of resistance by the teachers due to unpreparedness and feeling of inadequacies as a result of lack of knowledge, experience and technical know-how. There is also possibility of abandonment of work on artificial intelligence due to indulgence and over reliance. Arokoyu and Chukwu (2017) opined that teachers' attitude influence students' attitude to teaching and

learning. Teachers should see development of AI as an avenue to complement human capabilities towards achieving better results in education (Popenici& Kerr, 2017; Hassani et al, 2020).Artificial Intelligence has come to stay. Teachers have to occupy their position as masters instead of servants to navigate positively numerous benefits and potentials of artificial intelligence for the betterment of humans while minimizing its concerns in our world.

Students' Attitude towards Artificial Intelligence

Over the years, studies (Umar & Samuel, 2018; Ali, Toriman, &Gasim,2014) have it that students' attitudes such as lack of interest, indifference, laziness to work, among others have contributed immensely to poor academic performance in science. Fareo (2019) opined that courage in tackling difficult tasks, speed and accuracy in completing tasks are influenced by positive attitude in students. Negative attitude that breeds laziness to perform some tasks provided by AI in order to facilitate deep learning could mitigated against the profit of artificial intelligence in education.

Preparing Teachers for Artificial Intelligence Education Movement

Preparation of teachers for artificial intelligence move is a big to task to any nation especially developing nations. This preparation will entail seminars, workshops, conferences, books, computers, Information and Communication Technology gadgets, internet connections, power supply, data, time, among others. Questions arising include, who foot the bill of this preparation? Can the government convey teachers for this preparation? Can the government sponsor teachers for this preparation?

Cost Implication of Acquiring Artificial Intelligence Gadgets

Due to rise in foreign exchange, there is a hike in cost of items especially devices such as computers and electronics. Cost of living is so high that even the education communities are lamenting yet salaries are not increased. Acquiring artificial intelligence gadgets would be difficult in the face of prevailing issues in the economy.

Infringement of Right

Students' data and files may be hacked, shared and used indiscriminately due to exposure to the public. This could lead to increase in social vices, discouragement, distraction to learning, inability to complete tasks, increase cost of learning and prolong duration of graduation (Zawacki-Richter et al, 2019).

Enhancement of Teaching and Learning through addition of games

Thomas & Young (2010) advocated the use of games to motivate teachers and learners in order to sustain their interest on the tasks provided. Inclusion of games to artificial intelligence in teaching and learning will be distractive to teaching and learning. This method, if not properly monitored, abuse is inevitable.

The Way Forward

Remedial measures that can help in the adoption of artificial intelligence include government willingness to fund project, involvement of teachers in the initiative, involvement of students in the initiative, production of appealing, creative and innovative instructional materials and training and retraining of teachers.

Government Willingness to Fund Project

Artificial Intelligence project is a huge capital-intensive project that requires government funding to succeed. It will be difficult for individuals to fund this project due to its numerous involvements. The government of the day must be willing and ready to fund this project in terms of infrastructure, training, recruitment, among others so as to motivate and arouse stakeholders and education communities to key in to the program and own it as a project that must succeed.

Involvement of Teachers in the Initiative

The government, policy makers, curriculum developers, artificial intelligence engineers and program developers in education should endeavor to involve the teachers who are the implementers of this project in order for them to own it as their project and endeavor to make it succeed. Amadioha (as cited in Cleopas, 2020) revealed that experienced educationists should handle policy and implementation process in education and not armchair administrators who do not know happenings in the classrooms. This is due to the fact that if the teachers fail to implement this project at the grassroot, the project is bound fail.

Involvement of Students in the Initiative

Teaching and learning in digital age in analog environment is boring and not interesting while learning of digital natives in digital environment will be interesting and result oriented. Students as digital natives will be enthusiastic about this innovative change in teaching and learning. However, there is a need to train and retrain them in the use of artificial intelligence techniques so as to maximize AI potentials (Zhai, Chu, Chai, Jong, Istenic, Spector, Liu, Yuan, & Li, 2021).

Production of Appealing, Creative and Innovative Instructional Materials

John andKawu(2015) are of the opinion that instructional materials used in teaching and learning is one of the factors that hamper students' academic achievement. Aim, type and quality are some criteria to consider when producing instructional materials for learners. Developers of AI should collaborate with teachers in order to create relevant and captivating materials that will sustain and foster teaching and learning.

Training and Retraining of Teachers

Teachers, especially the older ones with wealth of experience but little computer competence should be actively involved in training in relevant computer skills and attitudes. Self-development such as reading books, researches, attending seminars, workshops and conferences should be regular in order to be abreast with latest information that will add value to education. AkinwumiandFalemu (as cited in Cleopas, 2018) advocated for teachers training through seminars, conferences and workshops so as to equip them with latest techniques for teaching and learning. The 21st century skills which entail fundamental literacies, competencies and character qualities advocate a lifelong education to ensure active learning, deep learning, quality delivery, sustainability and national development (Joshi et al, 2021).

Conclusion

The intelligent and success story of artificial intelligence come from humans. Instead of artificial intelligence system displacing humans on their jobs, humans should employ themselves to be users of artificial intelligence systems. According to Baker and Smith (2019) technological shift needs national transformation that is reproduced on values, norms, lifestyles, skills, policies, social organizations,

teaching and learning. If humans refuse to be users of artificial intelligence then artificial intelligence system will displace humans on their jobs. There is need for training and retraining of teachers to acquire and improve skills and attitude in order to combine effectively and efficiently technology, creativity, innovation and artificial intelligence to enhance teaching and learning(Hassani et al,2020).As AI conclusions are described to be remarkably correct and brings development to all sectors.

Suggestions

- a. The Federal Government of Nigerian should deliberately fund artificial intelligence projects for sustainability in education.
- b. Teachers should be well represented and actively involved in policy making and deliberation on the project.
- c. There should be training and retraining of teachers to acquire and improve skills for competence, effectiveness and efficiency.
- d. There should be adequate and incessant awareness creation of AI. Awareness of the benefits of embracing AI should be continually highlighted in all Nigeria educational system. This way the threats and opportunities would be deliberated and gray parts cleared.

Reference

- Ali, A.R., Toriman, M. E. & Gasim, M. B. (2014): Academic achievement in biology with suggested solutions in selected secondary schools in Kano State. *Nigeria International Journal of Education and Research*, ISSN: 2201-6740, 2(11), 215-224.
- Arokoyu, A. A. & Chukwu, J. C. (2017). Biology teachers' methods of teaching and academic performance of secondary school students in Abia state. *Journal of Emerging Trends in Educational Research and Policy Studies*, ISSN: 2141-6990, 8(4), 228-231.
- Ayoub, Dan. "Unleashing the power of AI for education". MIT Technology Review.
<https://www.technologyreview.com/2020/03/04/905535/unleashing-the-power-of-ai-foreducation/>
- Baker, T. & Smith, L. (2019). Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges. Retrieved from Nesta Foundation.
https://media.nesta.org.uk/documents/future_of_AI_and_education_v5_WEB.pdf.
- Cleopas, B. C. (2018). Effective implementation of educational policy: A panacea for social reforms and national security in Nigeria. *Niger Delta Journal of Education*, 1(1&2), 134-141.
- Cleopas, B. C. (2020). Challenges and prospects of science education in the context of educational reforms in contemporary Nigeria. *Niger Delta Journal of Education*, 12(1), 189-198.
- Evans, D. (2011). The internet of things: how the next evolution of the internet is changing everything. Cisco internet Business Solutions Group (IBSG).
http://www.cisco.com/c/dam/en_us/about/ac79/docs/innov/loT_IBSG_0411FINAL.pdf.
- Fareo, D. O. (2019). Study attitude and academic achievement in biology at senior secondary level in Mubi metropolis of Adamawa state. *International Journal of Scientific and Research Publications*, ISSN: 2250-3153, 9(8), 333-340.
- Hassani, H., Silva, E. M., Unger, S., TajMazinani, M. & MacFeely, S. (2020). Artificial Intelligence (AI) or Intelligence Augmentation (IA): what is the future? 1-14. Doi: 10.3390/ai1020008.
- Joshi, S., Rambola, R. K. & Churi, P. (2021). Evaluating artificial intelligence in education for next generation. *Journal of Physics*. 1-14. Doi: 10.1088/1742-6596/1714/1/012039.
- Lindner, A & Romeike, R. (2019). Teachers perspective on artificial intelligence. ISSP 2019: 12th International Conference on Informatics in Schools. Situation, Evaluation and Perspectives. Larnaca, Cyprus. 1-13.
- Marr, B. (2018). How is AI used in education? Real world examples of today and a peek into the future. Forbes. (online) 25 July 2018.
- Popenici, S. & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*. 1-13. <https://doi.org/10.1186/s41039-017-0062-8>.
- Russel, S. & Norvig, P. (2010). *Artificial Intelligence- a modern approach*. New Jersey: Pearson Education.
- Selwyn, N. (2016). *Is technology good for education?* Cambridge, UK: Malden, MA: Polity press.

- Stone, P., Brooks, R., Brynjofsson, E., Calo, R., Etzioni, O., Hager, G.,.....&Leyton-Brown, K. (2016). Artificial intelligence and life in 2030: One hundred year study on artificial intelligence. Report of the 2015-2016 study panel.
- Thomas, J. M. & Young, R. M. (2010). Annie: automated generation of adaptive learner guidance for fun serious games. *IEEE Transactions on Learning Technologies*. 3(4). 329-343.
- Umar, U. S. & Samuel, R. I. (2018). School location as correlates of students' achievement in Basic Science. *Journal of Innovative Education Research*, ISSN: 2354-2942, 6(3), 14-17.
- Zawacki-Richter, O., Marin, V. I. & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education- where are the educators? *International Journal of Educational Technology in Higher Education*. 1-27.
<https://doi.org/10.1186/s41239-019-0171-0>
- Zhai, X., Chu, X., Chai, C., Jong, M., Istenic, A., Spector, M., Liu, J., Yuan, J. & Li, Y. (2021). A review of artificial intelligence (AI) in education from 2010- 2020. 1-18.
<https://doi.org/10.1155/2021/8812542>.