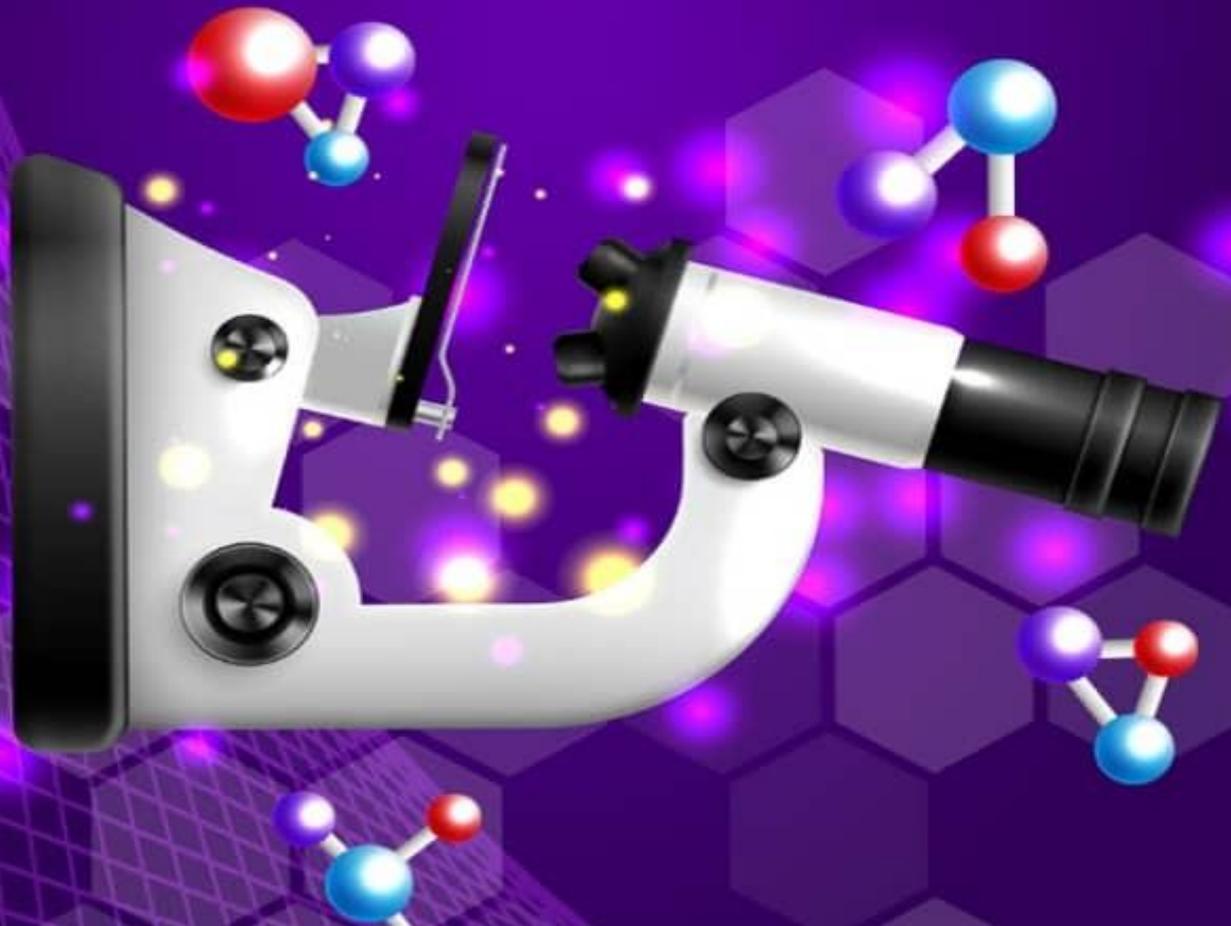# FOS

MULTI-DISCIPLINARY

JOURNAL

(Alvan Ikoku Federal University of Education)

ARTIFICIAL INTELLIGENCE: A FACTOR OF INTEREST FOR ENHANCING ACADEMIC ACHIEVEMENT IN INTEGRATED SCIENCE EDUCATION

[1]Ozioko, S.U, (Ph.D), [2]Azubuike, E.N. & [3]Ugwu, D.U.
Department of Integrated Science. Faculty of Sciences, Alvan Ikoku Federal University of Education, Owerri Imo state, ugwusylvester65@gmail.com 08068531760
nnamdieleazar@gmail.com 08038156255
[3]Department Physics. Faculty of Sciences, Alvan Ikoku Federal University of Education, Owerri Imo state. 07064666810

Abstract

Education is an instrument per excellence for nurturing the growth and development of a nation as well as human beings. The growth and development of science education has been enhanced by the artificial intelligence. Artificial Intelligence (AI) is the utilization of computers and robots to perform the task that is meant for human intellectual processes. Artificial Intelligence has contributed immensely in the globalization of science education as well as researches and learning. Artificial intelligence has dominated all the human activities such as education, industries and communication. This paper therefore examined the difference between natural/human and artificial intelligence. Furthermore, it critically assessed the challenges and ethical issues in utilization of artificial intelligence in integrated science education. Prospect and challenges of application of artificial intelligence in science education were comprehensively X-rayed. Recommendations were made on how to utilize artificial intelligence to enhance academic achievement of students in integrated science education.
Keywords*: Integrated Science Education, Academic Achievement, Artificial Intelligence.*

Introduction

Education is an instrument per excellence for nurturing the growth and development of a nation as well as human beings (Obioma 2013).It is the greatest assets parents, philanthropists and government can bequeath to students. According to Asianbek (2017) education is the organized and regulated processes of transferring abundant knowledge from one generation to another generation. Education is very broad in nature and comprehensively covers knowledge acquired from social sciences, arts, physical sciences, science education as well as non- formal education. Education has been classified as formal, informal and non-formal education. Formal education is the type of knowledge acquired from school. Integrated science education is domiciled in formal education. Science generally is the study of nature and things therein (Iwu, et al, 2013). According Ozioko, Azubuike & Nnamdi (2020), integrated science is a holistic science subject that embraces the rudiment of biology, chemistry and physics. Integrated science is special because the curriculum is leveraged on an inter-disciplinary approach that is based on enquiry, acquisition of scientific knowledge and skills that links them to technological inclination. It is taught at tertiary institution as integrated science, at secondary school as basic science and at primary school as basic science and technology. The integration of the aforementioned rudiments of science subjects in primary and secondary schools provide strong footings for the

study of biology, chemistry and physics on transiting from secondary to higher institution for better academic achievement.

In concise term, academic achievement of students in integrated science refers to the extent an instructors, students and institutions were able to attain their targeted short or long-term education goals(en.wikipedia.org>wiki>academic achievement). According to Agada (2020) academic achievement of students in integrated science is dwindling, weak or poor because of factors like poor study habit, lack of facilities, anxiety, climatic effect and peer influence. Academic achievement is comprehensively gotten by determining the grades and grade point Average (GPA) of students (Ricarda et al,2015). One of the successful ways of enhancing academic achievement in integrated science is perhaps through the introduction of artificial intelligence (AI) in teaching and learning. For about two decades now, the teaching and learning of integrated science has been dominated by traditional method of chalk and talk. The dominance has lasted for many decades and has been broken through the enhancement of teaching integrated science with artificial intelligence (AI).Artificial intelligence (AI) is smart or efficient machine designed and produced by human being to do some work that required human intelligence (Aruna,2021). Artificial intelligent (AI) is a term used to describe powerful computer driven robots or computer system that performed work similar to human intelligence such as problem-solving, automated decision-making process and reasoning (www.couesera.org). Ahmed (2023) classified AI into three categories of Narrow AI, General AI or strong AI and Super AI. Narrow artificial intelligence (AI) is specific in function and solves problems like translating one language (Igbo) to Hausa, facial recognition as used by forensic biologist, speech recognition, image recognition (photograph) and for recommendations. 'The second is general (AI) or strong (AI) which is designed and produced to tackle problem human being are incapable of achieving such as understanding language, solve different problems, make-decision and exhibit emotions. The ethical issues or fear is that it capable of surpassing human intelligence and lead to large scales unemployment(www.couesera.org) . Typical example of such machine are Alpha- Go which performs board games ,Siri which is capable of sending message, answering people or students' questions, making recommendations and setting reminders. The second, but wonderful one is general(AI) like the chat APT which is capable of having conversation with human beings, answer questions and equally prepare email for people. Another powerful AI, but the last is super AI. This category of AI has the ability to surpass human intelligence in all aspect of life. It may be capable of providing answer to climate change, epidemics (diseases) and how to alleviate poverty as well as perfect teaching of science. The three examples of super (AI) are sky net (terminator),Viki (irobot)and lastly Javis (ironman).

Challenges of Using General and Super artificial Intelligence for Teaching Integrated Science
General and Super artificial intelligence are two instructional materials that enhance teaching and learning of integrated science in recent time. Although, they are vital for teaching and learning, there are some associated challenges of the instructional materials. Among the outlined challenges are;

- **Control and Safety of Artificial Intelligence**; Both General and Super artificial intelligence are sophisticated machine used for teaching and learning and many teachers have not been trained on how to use them effectively. The consequences may be the inability to produce accurate examination results and documents due lack of knowledge and malfunctioning.
- **Unemployment;** Sufficient installation of general and artificial intelligence may lead to unemployment because it can perform virtually all the functions of human beings such as instructing, setting of examination questions, marking, grading and results.
- Another challenge of the general and super artificial intelligence is in the area of decision making. They are automated equipment that cannot take personalize decision hence they depend data garbage in.
- **Privacy**; All the AI system need data such as institutional data, teacher's records and student's information which need to be kept confidential and respected too. The data can be hacked and information exposed.

Differences between Human Intelligent and Artificial Intelligent (AI) System
At this juncture it is wise to x-ray the differences between human or natural intelligent (HI) and artificial intelligent (AI) in teaching and learning integrated science.

	Human intelligent (HI)	Artificial intelligent(AI)
1	Human intelligent has high rate of error in pedagogical activities.	AI error rate is minimal
2	Human beings can be stressed up due to excessive workload in teaching.	AI works for a very long period without stress
3	Human beings reason out creative and innovative ideas without data installation during teaching.	AI work is based on garbage in data
4	Human beings expresses empathy, feels emotion and personalized understanding such touching and sympathizing with students	AI lacks the moral capabilities. to feel such emotion understanding and empathy
5	Human is mortal and is created by the Almighty God, it can breakdown or die while teaching	AI consists of micro-chips assembled by man and feed with data to perform a particular task. It is immortal and cannot breakdown easily.
6	The instructions of human beings are relatively sluggish	AI performs it's work at very fast rate
7	Human beings initiate new instructional methods by means of cognitive process.	AI is automated and cannot develop cognitive process

Source; online.hull.ac.uk>blog>what-is-artificial intelligence

The Importance of AI for teacher's and Students' Academic Achievement in Integrated Science

The importance of AI in science education is glaring and cannot be overemphasized. Artificial Intelligence such as computer system, Android phone and computer robot have been judged as the best source of educational empowerment in all levels of education system. Their contributions have been outlined thus.

- Artificial intelligence machines provide adequate intelligent tutoring systems. It has been identified to provide meaningful guidance and support by explaining difficult concepts and answer students' questions. It aids self directed learning such as solving tutor mark assignment (TMA) online. It is also generating scores for computer based test (CBT).
- It is a source of educational resource materials for teachers and students to solve their assignments and projects.
- Computer and androids phone have enabled students to embark on distance learning programme which enable students participate in online lectures, take CBT tests and examination and graduate at the appropriate time.
- AI has also afforded students the opportunity to solve WAEC and JAMB questions online and pass with excellent results.
- AI helps students to break down complex subject matter into understandable manner, which enhance the learning and problem solving.
- AI tool like chat GPT and social media like Face book, We chat, and WhatsApp help students in research endeavor and excellent academic outcome.
- AI helps student conduct educational data analysis especially data collected from research work.
- AI helps in operational efficiency particularly in reducing work load of students.
- AI technology contributes immensely in students to adapt in current educational changes such as 7th APA edition, taking of CBT and JAMB examination and uploading of results online.
- AI enhances accessibility to handicap students such as special need learners through the use of Blair machine and phone recorders (Abel, 2023).

Challenges of Enhancing Students Academic Achievement through AI in our Schools

- **Epileptic power supply**: One of the critical setbacks in education progress of the country is the poor power supply. Students who use computer and Android phone for their study and assignment are seriously rendered helpless because of incessant power failure.
- Another serious challenge is students' poor knowledge in utilizing artificial intelligent machines for analysis of data.
- **Funding**: Many students cannot afford to buy computer and Android phones which are indispensible for achieving maximum academic achievement in sciences.
- **Poor maintenance culture**: Few educational facilities in the schools such as computers, internet facilities such as Wi-Fi and television sets lack proper maintenances culture.

- Lack of experts to use Artificial Intelligence tools and facilities for teaching students, and to assist them do their assignments. Well trained experts are also needed to help students interprets the output or results produced by artificial intelligence.
- Malfunctioning of the physical and software facilities such as computer, android phone, Modem, Flash and destruction of stored information

Recommendations

It is pertinent to outline some ways of making AI functional for enhancing the academic achievements of students.

- Adequate power supply should be provided to empower AI machines such as computer, Android phone and Television used for teaching and learning.
- Government and institutions of higher education should organize regular workshop and seminar for students and teachers on how to use AI for learning and teaching.
- Artificial Intelligence machine and robots are very expensive. Governments, institutions and NGOs should establish ICT centers and equip them with modern and enough AI machines.
- The three maintenance culture such as preventive, predictive and corrective maintenance should be adopted to keep the AI machines working.
- Experts should be employed to train & maintain the AI machines in various institutions.

Conclusion

Although, artificial intelligence (AI) performs its task very fast with limited error, we should not over ride human intelligence (HI) that produced artificial intelligence.

References

Abel, G. (2023). *The future Benefits of Artificial Intelligence for students*. Urbeuniversity.edu

Academic Achievement, Retrieved 13 May 2024 from encyclopedia, wikipedia

Agada, K.C. (2020).A Study on student's achievement and perception of integrated science in college of education in Nigeria.www.iosrjournals.org

Ahmed, B. (2023).Narrow AI vs. General AI vs. Super AI. www.linkedin.com

Akkor, R. &Attah, P.E.(2005).Contribution of Technology education in achievement of sustainable Democracy. *Nigeria Journal of Functional Education*, 4(1) 94-98.

Aruna, P. (2021).*Artificial intelligence*, defined in simple term.www.hectech.com.

Asianbek, N. (2017). *What is education*? International conference on the future of education.7th ed, .Florence Italy.

Ethical issue of artificial intelligence, Retrieved 12 May 2024 from www.corsera.org

Iwu, R.U; Duru, C.O., Ogbuneke, R.U, Ngozi-Olehi, Onoja, A.R, Ozioko S.U (2013) *Natural Science 1*,Cel Ben Publisher, www,celbezpublishing.com

Obioma, G. (2013).*Transforming Teacher Education and development for global competitiveness,* 25th convectional lecture, Alvan Ikoku College of education owerri. Imo State.

Ozioko, S.U; Azubuike, E.N; Nnamdi, I.O.(2020).Integrated science for National security and Development. *Alvan Journal of science* (12) A

Richards; Anaja,M, Anne,F.W.& Anne,F.W,(2015).A study on students' achievement and perception of integrated science, www.semanicscholar.org>paper

What is artificial Intelligence, Retrieved 14May 2024 from online, hull, ac.uk.>blog