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INTEGRATING ARTIFICIAL INTELLIGENCE TOOLS IN CURRICULUM DELIVERY AT TERTIARY EDUCATION LEVEL IN ANAMBRA STATE, NIGERIA

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Abstract
Artificial Intelligence (AI) is swiftly revolutionizing the education system, making its integration in curriculum delivery imperative for university lecturers to remain relevant in the changing learning environment. Consequently, this study explored integrating Artificial Intelligence tools in curriculum delivery at tertiary education level in Anambra State, Nigeria. Three research questions guided the study. Area of the study was Nnamdi Azikiwe University, Awka, Anambra State. Descriptive survey design was adopted. The researcher's self-constructed 23 items questionnaire, which was validated by three experts was used to collect data from 40 public university lecturers in Nnamdi Azikiwe University, Awka. The reliability coefficient of the instrument was 0.75. Data collected were analyzed using mean. The findings of the study revealed that lecturers are aware of artificial intelligence tools for curriculum delivery. Also, the findings of the study revealed that majority of the lecturers do not possess the requisite artificial intelligence skills for curriculum delivery at tertiary education level. In addition, the findings of the study revealed that lack of technological skills, inadequate provision of ICT resources, unstable power supply among others are the challenges of integrating artificial intelligence tools in curriculum delivery at tertiary education level. Based on the findings of the study, it was recommended among others that Federal Government should provide training opportunities as well as sponsor tertiary education lecturers in particular and other education level (primary and secondary) teachers for regular trainings on the use of emerging technologies particularly artificial intelligence tools in curriculum delivery to enable them acquire the skills and be able to equip the students for the future.

Keywords: Artificial Intelligence, Tertiary Education, Curriculum Delivery, Integrating and Artificial Intelligence Tools.

Introduction

The evolution and rapid increase of technology world-wide has automatically transformed every field of people's endeavour including education. This transformation brings about the use of technology to enhance physical classroom boundaries by expanding learning beyond its wall as well as incorporating real-world experiences into the instructional process in order to improve students' learning and prepare them for the future. Millson (2020) highlighted on this and explained that incorporating real-world experiences into teaching and learning will help students make meaningful connections to what they are learning and be able to apply them in real-world situations, thereby producing and shaping well-rounded and capable individuals who will contribute meaningfully to themselves and the societies in which they live. This application therefore is imperative for learners at all levels of education, more especially the tertiary education students.

Tertiary education is a post-secondary education level, which aimed at equipping its beneficiaries with relevant knowledge, skills and training required for useful and sustainable living in the society. This kind of education according to Federal Republic of Nigeria (2014) in the National Policy on Education is the education given at the universities, polytechnics, colleges of education and monotechnics as well as in the institutions that offer corresponding courses. According to Iviemu (2021), tertiary education is the education level that is saddled with the responsibility of producing quality graduates who will become great leaders and the workforce for the country's labour sectors. This suggests that tertiary education students need to be exposed to the type of learning that will prepare and equip them for life opportunities and challenges. It may not be surprising to state that in order to achieve this, curriculum delivery at this education level should be done with utmost priority. Curriculum is the integral part of education process, without which school cannot achieve the type of education a nation needs or even

shape the type of citizens a nation desires for her development. Correspondingly, Yasar and Aslan (2021) explained that curriculum is the constitution of education that directs an education system and defines the individuals to be raised in the society.

Curriculum delivery therefore is the integral and indispensable part of education process, as it is the process through which curriculum can come alive in the classroom through the use of various teaching methods, skills and resources. Nevertheless, without curriculum being delivered, the expected learning outcomes cannot be achieved, thus, leading to decreased academic success and lack of students' preparedness for the future. Succinctly, curriculum delivery is the practical process of delivering curriculum contents to students using various methods, strategies, skills and resources. In the views of Oyadonghan and Ifiezibe (2025), curriculum delivery is the methods, strategies and techniques employed by educators to impart knowledge, skills and attitudes to learners. Comprehensively, curriculum delivery is the presentation of the curriculum in the classroom, which involves the selection, organisation, presentation and assessment of learning activities and materials (Ifarajimi, 2023). In a nutshell, it is the process of delivering curriculum content and instruction to the level and understanding of the learners in the classroom, typically through the combination of teaching methods, techniques and materials.

Curriculum delivery has been done for centuries even up till now using conventional methods, which could be said to have been beneficial regarding wider coverage of lesson contents within a short period of time and facilitating of large class communication. Again, with conventional form of curriculum delivery, students may gain basic understanding but may struggle to apply the experiences independently in real-world situation. As a result, continuous use of it for instructional delivery may present several problems especially in this contemporary society. Some likely issues that may arise according to Idika, Arikpo, Ekpo, Idika and Okeke (2025) include: inability of meeting students' learning needs and pace, limited individual attention as lecturers may struggle to provide personalized feedback, guidance and support for individual students as well as dearth of resources. This is particularly challenging in today's education that is aimed at preparing students for the 21st century challenges and opportunities. This could be the reason Eslit (2023) asserted that conventional teaching methods are no longer sufficient to equip students with the skills and competencies necessary for success in an increasingly complex and interconnected world. In resolution, Idika, Akubuiro and Umobong (2012) emphasized that merging technology and online resources with traditional form of curriculum delivery can enhance students' learning experiences and past performances. Consequent upon this, integrating technology such as artificial intelligence, which is widely known as AI and also drawing attention as a tool that act like human beings with conventional form of curriculum delivery might help to reshape educational experiences.

Artificial Intelligence (AI) is a wide-range of field that involves all technologies that focus on creating machines and systems that can mimic or perform functions typically requiring human intelligence. According to Iorkyaan, Aza, Enape and Nwankwo (2023), artificial intelligence is a multi-disciplinary filed of computer science that aims to create intelligent machines capable of imitating human cognitive functions. In the view of Ergen in Almasri (2024), artificial intelligence is a broad field that encompasses various technologies that have been developed over the past years to enable machines to perform tasks traditionally requiring human intelligence such as receiving, reasoning, learning, interacting and sharing information. From all indications, artificial intelligence is the core technology that enables artificial intelligence tools to perform intelligent functions. Artificial intelligence tool therefore, is a software application that uses AI technology to perform specific intelligent functions. In the opinion of Murphy (2019), artificial intelligence tool is an application of software algorithms and techniques that allow computers and machines to simulate human perception and decision-making processes in order to successfully complete a task.

Artificial intelligence tools can be used to perform different functions in different walks of life of people including education. In education, artificial intelligence tools can be used to transform classroom teaching experiences by providing more accurate and consistent feedback, adapt contents for each student, adjust the pace and learning preferences to match students' strengths and weaknesses as well as

boost students' engagement and academic performance (Harry, 2023; Zafari, Bazargani, Sadeghi-Niaraki & Choi, 2022). For example, AI tools such as Carnegie Learning, ALEKS and Knewton can provide individualized instruction, tailor learning paths based on students' strengths and weaknesses and help students stay motivated and engaged with their learning (Owan, Abang, Idika, Etta & Bassey, 2023). They further asserted that Grammarly, Google Cloud Natural Language, IBM Watson and Microsoft Azure Cognitive Services can help students learn languages and improve their writing skills by providing real-time feedback on writing, including suggestions for grammar, spelling and punctuation feedback. This can help students improve their skills and produce higher-quality written works. Again, artificial intelligence tools such as Otter.ai, Amazon Transcribe, Dragon Naturally Speaking and Google Voice can make curriculum contents more inclusive and accessible by transcribing and translating voice into text in real-time teaching to assist students who may have hearing impairments or those who may be having difficulty understanding the language been used in the coursework. On the other hand, Speechify-text-to-speech tool can be used to turn texts into natural sounding voice for students who may have visual impairments.

In addition, artificial intelligence tools can assist lecturers to make teaching and learning process flexible and accessible for all students, increase effectiveness of instruction and improve students' participation level. For example, AI tools such as Google Meet, Microsoft Teams, Zoom, Cisco Webex, GoToMeeting and Skype can allow lecturers to facilitate virtual classroom sessions, provide remote instruction and connect with students in remote locations. Facebook, Instagram, WhatsApp and Twitter can enable lecturers to connect with students, share lecturing resources and promote students' engagement in lecturing activities. Also, Edulastic, ExamView and Google Forms can enable lecturers to assess students' knowledge and skills using a variety of question types such as multiple-choice, short answer and Essay. In adition, Delgado, deAzevedo Fay, Sebastiany and Silva (2020) asserted that with artificial intelligence tools such as Learning Analytic and Knowledge (LAK) and Open Learning Analytics (OLA), students at risk of falling behind or have need to benefit from additional assistance or remediation can be identified. They further explained that the tools can use data mining and AI algorithms to analyze students' learning data and provide insights into students' performance, engagement and learning outcomes.

Apparently, these benefits suggest the need for integrating artificial intelligence tools in curriculum delivery specifically at tertiary education level for effectiveness. Integrating simply means combining or using new thing alongside the extant one to make it become more effective. In other words, integrating artificial intelligence tools in curriculum delivery means digitizing curriculum delivery process by combining or using artificial intelligence tools in the process to improve teaching and learning process towards more positive learning outcomes. This pedagogical shift can make curriculum delivery more interactive and interesting, enabling inclusive and adaptable learning environment towards meeting the diverse learning needs of students, thereby leading to positive learning outcomes. In consonant, Idika et al. (2025) asserted that integrating AI in education can significantly improve the effectiveness of instruction more than teaching and learning experience in the face-to-face era.

Furthermore, integrating artificial intelligence tools in curriculum delivery can also develop and equip the learners with 21st century skills needed to thrive in the future. In agreement, Oyewale and Jonathan (2021) posited that the use of technology in teaching and learning equips students with the digital literacy skill, inventive thinking skill, effective communication skill, teamwork and so on. In spite of this, the researcher as a lecturer observed that majority of the tertiary institution lecturers in Anambra State, specifically, the university lecturers are yet to fully integrate artificial intelligence tools in their curriculum delivery. To buttress this, result that emanated from the study by Emiri, Ijiekhuamhen and Nwankwo (2024) revealed that lecturers' use of AI tools in their academic practices is low. This could either be that the lecturers are not fully aware of the artificial intelligence tools for educational process or that they do not possess the requisite skills for their proficient use. Undoubtably, integrating AI tools in curriculum delivery is a complex process. It requires that lecturers who are curriculum deliverers must demonstrate total awareness of the AI tools for teaching and learning at tertiary education level as well as possess the requisite skills needed for their effective and efficient use. In corroboration, Akarah, Aziken and Onanore (2025) asserted that successful adoption of AI depends significantly on

foundational awareness and understanding of the tools.

Nevertheless, several researchers have carried out researches on the awareness, adoption and utilization of artificial intelligence in education. For instance, Onwuagboke, Nnajieto, Nzeako and Umune (2024) investigated on lecturers' awareness of artificial intelligence for teaching and research in Alvan Ikoku Federal University of Education, Nigeria and found that lecturers were aware of AI tools for teaching and research. Emiri et al. (2024) in their study revealed that lecturers in the two selected universities possess slightly above-moderate competency in AI-related skills. Also, Amadi-Iwai, Ubulom and Okiridu (2024) in their study found that educators have low level of awareness of artificial intelligence and also, they do not have adequate competence on how to employ AI in teaching. On the other hand, Idika et al. (2025) examined lecturers' awareness and utilization of AI for effective teaching of research methods in the University of Calabar, Nigeria and found that technical issues, lack of skills, restricted access, lack of training and costs are the challenges to effective use of artificial intelligence for instruction. From the above findings, there is no indication of related studies carried out within the area of the study of the present study. Based on this, the researcher sought to explore integrating artificial intelligence tools in curriculum delivery at tertiary education level in Anambra State, Nigeria. In this view, the following questions were raised to guide the study:

Research Questions

1. What artificial intelligence tool for curriculum delivery at tertiary education level are lecturers aware of?
2. What artificial intelligence skills for curriculum delivery at tertiary education level do lecturers possess?

3. What are the challenges that can militate against integrating artificial intelligence tools in curriculum delivery at tertiary institutions?

Method

The study adopted a descriptive survey design. Three research questions guided the study. The area of the study was Nnamdi Azikiwe University, Awka, Anambra State of Nigeria. Population of the study comprised 261 lecturers in the Faculty of Education of the University. The sample size for the study comprised 40 lecturers drawn from the population. Simple random sampling procedure was used for the selection. The instrument titled "Integrating Artificial Intelligence Tools in Curriculum Delivery Questionnaire (IAITCDQ)" was developed by the researcher and structured on a 2-point rating scale of Aware and Not Aware for research question one and 4-point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) for research questions two and three respectively. The instrument contained 23 items and was duly validated by three experts. Reliability of the instrument was obtained using both Kudder-Richardson-20 and Cronbach Alpha respectively, which yielded the coefficient value of 0.75. The researcher personally administered the instrument through direct delivery to the respondents. Data were analyzed using mean. The cut-off point for accepting percentage score was put at 50% for RQ one and mean score of 2.50 for RQs two and three, with the decision rule that the aggregate percentage score from 50% and above and any cluster mean score from 2.50 and above were interpreted as Aware and Agreed respectively while the aggregate percentage score below 50% for RQ one and cluster mean score below 2.50 for RQs two and three were interpreted as Not Aware and Disagreed respectively.

Results

Table 1: Mean Rating of Respondents on Artificial Intelligence Tool for Curriculum Delivery at Tertiary Education Level Lecturers are Aware of

		Aware			Not Aware		
S/N	**Item**	**Freq**	**(%)**	**Dec.**	**Freq.**	**(%)**	**Dec.**
1	Carnegie Learning	2	5	Not Aware	38	95	Aware

2	PDF AI	24	60	Aware	16	40	Not Aware
3	WhatsApp	40	100	Aware	0	0	Not Aware
4	Grammar Checker	37	92.5	Aware	3	7.5	Not Aware
5	Google Meet	29	72.5	Aware	11	27.5	Not Aware
6	Otter.ai	10	25	Not Aware	30	75	Aware
7	Speechify-Text-to-Speech	13	32.5	Not Aware	27	67.5	Aware
8	Google Form	33	82.5	Aware	7	17.5	Not Aware
	%Aggregate		**58.75**			**41.25**	**Aware**

Data in Table 1 show that item numbers 2, 3, 4, 5 and 8 have percentage scores above the cut-off point of 50%. This indicates that the respondents are aware of the items for curriculum delivery. On the contrary, item numbers 1, 6 and 7 have percentage scores below the criterion percentage of 50% showing that the respondents are not aware of the items for curriculum delivery. However, the percentage aggregate of 58.75% for aware and 41.25% for not aware directly or indirectly show that lecturers are aware of the artificial intelligence tools for curriculum delivery at tertiary education level.

Table 2: Mean Rating of Respondents on Artificial Intelligence Skills for Curriculum Delivery at Tertiary Education Level Lecturers possess

S/N	I can:	Mean	Remark
1	Use Otter.ai to transcribe voice into text in real time teaching	2.3	Disagree
2	Use Brisk teaching tool to integrate creating lesson with Google tools	2.2	Disagree
3	Share lecturing resources to students using WhatsApp	2.7	Agree
4	Use Carnegie learning to adapt to each students' learning pace	2.2	Disagree
5	Assist students to improve their writing skills using Grammarly	2.5	Agree
6	Use Google Meet to facilitate virtual classroom sessions	2.1	Disagree
7	Turn text into natural sounding voice in Google chrome using Speechify-text-to-tool	2.4	Disagree
8	Use variety question types to assess students' knowledge using Google forms	2.5	Agree
	Cluster mean	**2.4**	**Disagree**

Data in Table 2 indicate that item numbers 3, 5 and 8 have mean scores above the cut-off mean of 2.50. This indicates that the respondents possess the artificial intelligence skills for curriculum delivery at tertiary education level. Conversely, item numbers 1, 2, 4, 6 and 7 have mean scores below the cut-off mean of 2.50 indicating that the respondents do not possess the artificial intelligence skills for curriculum delivery at tertiary education level. The cluster mean of 2.4 shows that lecturers do not possess the artificial intelligence skills for curriculum delivery at tertiary education level.

Table 3: Mean Rating of Respondents on the Challenges that can Militate against Integrating Artificial Intelligence Tools in Curriculum Delivery at Tertiary Institutions

S/N	Challenges that can militate against integrating AI tools in curriculum delivery are:	Mean	Remark
1	Lack of artificial intelligence tools' skills	3.5	Agree
2	Limited access to digital devices	3.4	Agree
3	Unstable power supply	3.3	Agree
4	Lecturers' attitude towards the use of artificial intelligence tools for teaching	3.0	Agree
5	Poor Internet network services	3.5	Agree
6	Lack of in-service training on the use of artificial intelligence for teaching and learning	3.3	Agree
7	Technophobia	2.4	Agree
	Cluster mean	**3.2**	**Agree**

Data in Table 3 indicate that all the items have mean scores above the cut-off mean of 2.50. This indicates that the respondents agree with all the items as challenges that can militate against integrating artificial intelligence tools for curriculum delivery. The cluster mean of 3.2 shows that there are

challenges that can militate against integrating artificial intelligence tools in curriculum delivery at tertiary institutions.

Discussion

Artificial Intelligence Tools for Curriculum Delivery at Tertiary Education Level Lecturers are Aware Of.

The findings of the study revealed that lecturers are aware of artificial intelligence tools for curriculum delivery at tertiary education level. This could be attributed to the ubiquity of technology and lecturers' exposure to the use of technology in carrying out their daily activities, research and other academic activities. Thus, making them aware that there are some of the artificial intelligence tools that can assist effectively and efficiently in teaching and learning process. This finding is in consonant with the findings of Onwuagboke et al (2024) that lecturers were aware of AI tools for teaching and research, but at variance with the findings of Amadi-Iwai et al (2024) that Business educators in universities have low level of awareness of artificial intelligence.

Artificial Intelligence Skills for Curriculum Delivery at Tertiary Education Level Lecturers Possess

The findings of the study revealed that majority of the lecturers do not possess the artificial intelligence skills for curriculum delivery at tertiary education level. This may not be far from the fact that some lecturers are not technophiles, thereby, they may become uninterested with anything that has to do with technology. This in one way or the other limits their ability to acquire digital skills for curriculum delivery and as such can hinder integration of AI tools in curriculum delivery. Moreover, lack of professional development and limited access to necessary resources and equipment can be the reason for lecturers' inability to possess the skills as they are neither exposed nor be sponsored for regular and continuous training that will enable them to possess the skills for curriculum delivery. The finding of the study is in line with the findings of Amadi-Iwai et al (2024) that business educators in universities do not have adequate skills and competencies on the use of AI in teaching, but was in disagreement with the findings of Emiri et al (2024) that lecturers in the universities possess slightly above-moderate competency in AI-related skills.

Challenges that can Militate against Integrating Artificial Intelligence Tools in Curriculum Delivery at Tertiary Institutions

The findings of the study revealed that there are some challenges that can militate against integrating artificial intelligence tools in curriculum delivery at tertiary education level. These include lack of artificial intelligence tools' skills, limited access to digital devices, unstable power supply, poor internet connectivity, lack of in-service training and lecturers' attitude towards the use of AI tools for teaching. This may not be far from the truth that the use of emerging technologies in Nigerian situation is a complex process which can be faced with a lot of challenges. The finding of the current study is in line with the discoveries of Idika et al. (2024) that technical issues, lack of skills, restricted access, lack of training and costs are the challenges to effective use of artificial intelligence for instruction.

Conclusion

Based on the findings of the study, it was concluded that lecturers are aware of Artificial intelligence tools for curriculum delivery at tertiary education level. Also, that lecturers do not possess the requisite skills for the use of artificial intelligence tools for curriculum delivery at tertiary education level. In addition, there are some challenges that can militate against integrating artificial intelligence tools in curriculum delivery at tertiary education level.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Federal Government should create opportunities by sponsoring tertiary education lecturers in particular and other education level (primary and secondary) teachers for regular trainings on the use

of emerging technologies particularly artificial intelligence tools in curriculum delivery to enable them acquire the skills and be able to equip the students for the future.

2. The Federal Government in collaboration with the university authorities should ensure that school environment is physically and resourcefully made conducive and enabling by equipping the school with ICT resources and also provide lecturers with laptops and data for effective integration of artificial intelligence tools in the classroom.

3. Federal and State Government should attend to the needs of education by ensuring that the standard of living of both parents and students are improved as well as ensuring that the societal hope of education is not truncated by making sure that the identified challenges are maximally reduced.

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