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REVOLUTIONIZING TEACHING, LEARNING AND ASSESSMENT METHODS IN NIGERIAN TERTIARY INSTITUTIONS: THE TRANSFORMATIVE POWER OF ARTIFICIAL INTELLIGENCE (AI) TOOLS

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Abstract

Artificial intelligence is rapidly transforming the global education sector by offering innovative tools that enhance teaching, learning and assessment methods. These tools are not only changing the way educators deliver knowledge but also the way students interact and absorb information. Unfortunately, teaching, learning and assessment in tertiary institutions heavily rely on manual processes such as face-to-face instructions, paper-based assessments, inconsistent grading practices, backlogs of feedback, inequitable access to quality education, insufficient preparedness for the demands of a rapidly changing workforce, an overwhelming administrative load on lecturers and limited access to modern technology resources. On this note, this paper explores transformative power of artificial intelligence tools and in teaching, learning and assessment methods in Nigerian tertiary institutions. Through a critical analysis of existing literature, and expert insights, AI has transformative power in amplifying personalized learning, adaptive assessments, intelligent

Keywords:
Revolutionizing, Teaching, Learning, Assessment Methods, Tertiary Institutions, Transformative Power and Artificial Intelligence (AI) Tools

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tutoring, automation of interactive activities, timely feedback, monitoring of students' progress, assessment, prediction of future outcomes, collaboration and communication, translation of spoken content into multiple languages, identification of students at-risk, online assessment, virtual classroom sessions, connection of students with experts, sharing of learning resources, and gamification-based learning activities. In addition, data privacy and security concerns; digital divide and inequitable access; bias and fairness in AI Algorithms; transparency and accountability concerns; resistance to change and lack of expertise are ethical challenges of transformative power of AI tools. It is therefore recommended that Nigerian tertiary institutions must ensure compliance with data protection regulations such as the Nigeria Data Protection Regulation (NDPR). This can be achieved by investing in secure AI platforms, conducting regular audits, and providing training for staff and students on data privacy issues.

Introduction

The primary goal of tertiary institutions such as Universities, Polytechnics, Monotechnic, Colleges of Education and specialized training institutions in Nigeria according to the Federal Republic of Nigeria (2014) in her National Policy on Education, shall be to contribute to national development by training high-level manpower. Through tertiary education, a nations' human capital needs are met. Given its primary role as knowledge provider, tertiary education serve as a powerful means to help create a more sustainable future (Abanyam & Agbo, 2019). The duty of every tertiary education is to provide high-quality student-centered learning with comparative study programs and processes to meet the different needs of the labour market economy in a global economic perspective (Eneji*et al*., 2022). It is imperative that tertiary institutions ensure that their graduates are "employable" and make them productive contributors to the labour market (Succi & Canovi, 2020; Olayemi & Oluwatoyin, 2018). Unfortunately, in recent times, graduates from these tertiary institution in Nigeria are faced with problem of unemployment upon graduation (Ogunode *et al*., 2023; Ogunode & Emmanuel, 2023). In the vein, Okolie*et al*. (2019b) submit that an overdependence on certificates in Nigeria has promoted poor-quality learning. On a sad note, every year, tertiary institutions have been turning out graduates that have persistently congested the labour-market along with the unemployed youths in the nation (Harry *et al*., 2018).

Many reasons have been attributed for these observed ugly situations. Some of the reasons include: frequent usage of conventional or traditional teaching, learning and manual processes of assessment methods rely heavily on manual processes (Eze*et al*.

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(2018); face-to-face lectures, paper-based assessments, and limited access to modern technology resources (Afonughe*et al*., 2021); inequitable access to quality education and insufficient preparedness for the demands of a rapidly changing workforce, inconsistent grading practices, a backlog of feedback, and an overwhelming administrative load on teachers (Eli-Chukwu*et al.,* 2023).These methods often lead to overcrowded classrooms, delayed feedback, and a need for more personalized learning opportunities (Usman *et al*., 2024). Based on these reasons, academic tasks such as teaching, learning, grading assignments, diagnosing students' strengths and weaknesses, monitoring students' progress toward meeting desired levels of proficiency, assigning grades, and providing feedback to students, generating reports, and managing administrative paperwork can be automated using artificial intelligence, leading to increased efficiency and improved teacher-student interactions (Borbajo *et al*., 2023).

On this note, Artificial intelligence also known as AI, may be defined as 'man-made thinking power', in which artificial means 'man-made' and intelligence means 'thinking power' (Choudhury, 2022). AI is an innovative technical framework that encompasses the creation of computer systems with the ability to execute activities that usually need human intellect (Aina *et al*., 2023; Bassey & Owushi, 2023). AI encompasses various subfields like machine learning, natural language processing, robotics, and computer vision (Sutton &Barto, 2018). According to Franken field (2023) defined AI as using software-coded heuristics to simulate human intelligence. To Ogunode and Ukozor (2023), AI encompasses computer systems and technologies that emulate human intelligence, undertaking tasks like learning, reasoning, and problem-solving. AI, often referred to as the intelligence demonstrated by machines, encompasses a spectrum of technologies that enable systems to perform tasks that traditionally required human intelligence (Owebor *et al*., 2022; Mouchou *et al*., 2021).

The journey of AI can be traced back to the early 20thcentury, with the foundation laid by pioneers such as Alan Turing and John McCarthy (O'Regan, 2021). Alan Turing, a British mathematician and logician, is often regarded as the father of computer science and AI. His seminal work, "Computing Machinery and Intelligence" (1950), proposed the concept of a machine's ability to exhibit intelligent behaviour. Turing introduced the Turing Test, a criterion for determining whether a machine can exhibit human-like intelligence by engaging in natural language conversations indistinguishable from those between humans (Danziger, 2022). The term "Artificial Intelligence" was coined by John McCarthy in 1956 during the Dartmouth Conference, which is considered the birth place of AI as a formal field of study (Jaakkola *et al*., 2019). The early years of AI research were characterized by optimism and rapid progress, with significant achievements such as the development of the first AI programs capable of playing chess and solving algebraic problems (Kuipers & Prasad, 2022). However, the initial excitement was followed by

periods of reduced funding and interest, known as "AI winters," due to the limitations of computing power and the inability of early AI systems to meet high expectations. The usage of AI is growing at an unprecedented rate and it is rapidly changing the aspects of human life (Xue & Wang, 2022a). The rapid integration of artificial intelligence (AI) tools can be used to solve a variety of problems associated with teaching, learning and assessment methods in tertiary institutions (Edung, 2024).

The justification of using AI in teaching, learning and assessment methods cannot be overemphasized. AI has the potential to enhance instructional design and pedagogical development in the teaching processes (Hellings & Haelermans, 2020); accessing students' performance automatically (Zampirolli *et al*., 2021); offer individualized experiences by customizing information to meet the demands of each student (Malik, 2024); grade the students' essays and provide feedback on grammar, structure and content as well (Huang *et al*., 2023b); help to identify students at risk of falling behind or those that need remediation (Delgado *et al*., 2020); enable teachers to support students' self-directed learning (Caswell & LaBrie, 2017), create learning communities that are collaborative, and foster creativity in understanding concepts (Connolly *et al*., 2023); analyze provide personalized feedback to help students identify areas of strengths and weaknesses (Nazaretsky *et al*., 2022; Hooda *et al*., 2022); guaranteeing content that is coherent, succinct, and grammatically accurate (Dawes, 2023); improve assessments, and reduce planning time for teachers (Ayala-Pazmino, 2023); motivating students (Lin *et al*., 2021; Xia *et al*., 2022); raising students' engagement levels (Huang *et al*., 2023a; Nazari *et al.,* 2021); learning interest (Hou *et al.,* 2022); learners' interaction (Karsenti, 2019); anxiety reduction (Ren, 2020), prediction of students' future outcomes (Kumar, 2019; Luo*et al*., 2022) and boost academic performance (Khan *et al*., 2021).Finally, AI can also help students from different backgrounds collaborate on projects where they solve scientific problems together, removing barriers based on geography and fostering a global scientific community (Su & Zhong, 2022).

Transformative Power of AI Tools in Teaching, Learning and Assessment Methods

Artificial Intelligence (AI) is revolutionizing tertiary education, transforming the way institutions teach, learn and assess students. AI's potential to enhance academic experiences is vast and include:

Personalized Learning: AI-driven adaptive systems tailor learning pathways to individual students' needs, abilities, and learning styles (Cevikbas& Kaiser, 2022; Johnson, 2023). Such AI-platforms include: Knewton, DreamBox, Jill Watson, Century Tech, Quizizz, Carnegie, ClassDojo, Coursera, Khan Academy, ASSISTments, EdX, Edwiser (Dutta *et al*., 2024). Most especially, "Edwiser" offers an AI-driven scheduling system that optimizes class timetables and resource allocation, reducing conflicts and improving utilization

(Yusuf, *et al*., 2024). Also, the "ClassDojo" platform uses AI to facilitate classroom management, enabling instructors to track student engagement, communicate with parents, and provide real-time feedback. Besides preparing lesson contents and learning experiences, the tools can be used for individualized instruction (Mena-Guacas *et al*., 2023). Two institutions of higher learnings are outstanding in AI personalized learning platforms - Georgia Institute of Technology and University of Michigan. The Georgia institute for instance has implemented a personalized learning platform called ASSISTments, which provides students with targeted feedback and guidance based on their performance. Georgia Tech pioneered the use of AI teaching assistants, such as Jill Watson, in large online courses. These AI agents provide personalized support, answer questions, and offer tailored feedback to students (Preston, 2020).

Several Nigerian universities have already embraced AI technologies to revolutionize their educational processes. Tertiary institutions like Covenant University, Bayero University Kano (BUK), the National Open University of Nigeria (NOUN, Lagos State University (LASU), University of Ilorin (UNILORIN) and University of Lagos (UNILAG) (Okonjo, 2021; Ogunyemi, 2022) have adopted AI to personalize learning and improve student outcomes. NOUN, for instance, uses AI to cater to diverse student needs, including those of full-time workers and remote learners. Also, Bayero University Kano (BUK) leverages AI-driven virtual reality for hands-on medical training. These innovations demonstrate how AI enhances both learning and administrative efficiency in Nigerian higher education. As Nigerian universities adopt these innovations, they improve academic outcomes and better prepare students for a workforce reliant on digital and AI skills (Eze, 2022).

Intelligent Tutoring Systems (ITS): AI-powered virtual tutors (that is one-on-one tutoring) provide one-on-one support, feedback, and assessment (Graesser *et al*., 2018; Usman, 2023).Such AI-platforms include: Carnegie Learning's MATHia, IBM Watson Tutor, EdTech startup, Smart Sparrow, ALEKS, and Knewton (Johnson, 2022; Rajeshwari and Krishna, 2020). Additionally, ITS can track students' progress over time, enabling teachers to intervene when necessary and adjust instructional strategies. For instance, The University of Michigan has equally done well by developing AI-powered tutoring systems, such as Maisey, to provide students with individualized support in various subjects. These systems can adapt to student needs, offer 24/7 accessibility, and help students achieve their academic goals. Maisey is a user friendly platform that enables departments and instructors to create tailored AI tutors using their own data. In tests, its performance rivalled or surpassed that of human instructors, often outperforming commercial AI options (Starr, 2024). While many higher education institutions are exploring generative AI education, the University of Michigan stands out as the first major university to provide a customized AI platform for its entire community (Ono, 2024). For instance, University of Maiduguri (UNIMAID) explores ITS in its science and technology courses, providing

personalized experiences that foster independent learning. The use of these systems has shown promise in enhancing students' understanding of challenging subject matter (Ahmad &Borno, 2023).

Automated Grading: AI tools also automate the grading process and provide instant feedback on assignments, quizzes, and exams. AI can help automate administrative duties, freeing up teachers to concentrate more on instruction and less on paperwork (Fasola, 2024; Walter, 2024; Kanyemba *et al*., 2023).Such AI-platforms include: Gradescope, Turnitin**.** The software can also detect plagiarism, helping teachers to grade assignments more efficiently and accurately.

Predictive Analytics and Classroom Response Systems: AI tools can analyze student attendance, engagement, and performance data to predict future outcomes. This information can be used to identify students who may need additional support, enabling teachers to provide targeted interventions. While **c**lassroom response systems allow educators to pose questions and receive real-time student feedback using electronic devices. Examples include iClicker, Poll Everywhere, and Top Hat (Owan *et al*., 2023).

Content Creation: AI tools can generates educational content such as quizzes and interactive lessons, study guides, helping teachers create engaging and effective learning materials (Tzima *et al.*, 2020). Such AI-platforms include: ChatGPT, the latest version, GPT-4, is integrated into software such as Microsoft Office, Edge, and Bing, optimizing for educational tasks (Forero-Corba & NegreBennasar, 2024). AI tools Canva Magic Write and Slidesgo enhance content creation and delivery.

Collaborative and Communication: AI can facilitate collaboration among students by providing virtual environment for group work as well as enabling communication and feedback. Examples of AI-powered tools include: ChatGPT, Chatbots, Bing, and Virtual Assistants. For example, AI-powered Chatbots can offer on-demand support and resources, answering questions and guiding learners through various subjects in real-time (Ogunleye, 2023). Students use ChatGPT to brainstorm ideas, develop essay structures, and generate complete drafts, saving time in the initial phases of writing (Lavidas *et al*., 2024).

Natural Language Processing (NLP) and Plagiarism Detection: AI-powered NLP tools enable AI systems to understand, interpret, and generate human language. These tools can help students learn languages and improve their writing skills by providing grammar, spelling, and punctuation feedback (Raheem *et al*., 2023). Such AI-platforms include: Grammarly, Quillionz, Google Cloud Natural Language, IBM Watson and Microsoft Azure Cognitive Services. These AI platform can help students to refine their language use, improve their writing skills, produce higher quality written work, ensuring their work is polished and grammatically accurate (Oluwadiya *et al*., 2023). AI detects plagiarism in student work, ensuring academic integrity and promoting original thinking. AI-based

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plagiarism detection software uses NLP algorithms to analyze student work and detect instances of plagiarism. Examples include CopyScape, Grammarly, and Turnitin (Owan *et al*., 2023).

Automated Facial Recognition (FR), Automated Transcription and Translation: Machine vision seamlessly integrates with Automated Facial Recognition (FR) for attendance marking, and optimizing class time for both teachers and students in educational settings (Richter *et al*., 2019). This contributes to a more efficient use of instructional time and fostering an environment conducive to focused and productive learning. Inautomated transcription and translation, AI can help transcribe and translate lectures and other educational materials, making them accessible to a wider range of students (Owan*et al*., 2023). The software can also translate spoken content into multiple languages, making educational content more accessible to students who may speak different languages. Such AI-platforms include: Otter, Amazon Transcribe, Dragon Naturally Speaking, and Google Voice.

Virtual Assistants, Virtual Laboratories and Simulations: AI-powered virtual assistants can help students with administrative tasks such as scheduling, reminders, and task management. For example, AI-powered virtual assistants such as Brainly or Google assistant provide students with immediate support and answers to their academic questions (Owan*et al*., 2023). In virtual laboratories and simulations, AI guide students through scientific experiments, offering hands-on learning experiences without the need for physical lab equipment (Cano de lasHeras *et al*., 2021).

Automated Essay Scoring (AES) Software, Learning Analytics Tools and Computer-Based Testing (CBT) Platforms*:* AES software uses NLP algorithms to evaluate and grade essays and written assignments. Examples include e-rater, Grammarly, and Turnitin. Learning analytics platforms monitor student progress, identify at-risk students, and make data-informed decisions to improve student learning outcomes. Examples include Learning Analytics and Knowledge (LAK) and Open Learning Analytics (OLA). CBT platforms allow educators to administer online assessments, including multiple-choice, true/false, and essay questions. Educators can use CBT platforms to assess students' knowledge, save time on grading, and provide students with immediate feedback. Examples include Exam Soft, JAMB CBT, UNICAL Postgraduate e-exams, ProProfs, and Question mark (Owan *et al*., 2023).

Formative Assessment Tools and Gamification Tools: Formative assessment tools enable educators to monitor students' learning in real-time, provide feedback, and adjust instruction based on their performance. Examples include Edulastic, Exam View, Mentimeter, TopHat Nearpod, and Socrative. While gamification tools use game based elements to motivate and engage students in learning activities and assessments. Examples include Classcraft, Kahoot and Quizlet (Owan *et al*., 2023).

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Virtual Reality (VR) and Augmented Reality (AR) Tools: AI-driven VR and AR can enhance understanding through experiential learning, making abstract ideas more concrete. Examples include Google Expeditions, Merge Cube, and Nearpod VR (Owan *et al*., 2023). For instance, University of Nigeria, Nsukka (UNN) employs VR/AR tools in its science and engineering programs, providing hands-on learning opportunities that enhance students' grasp of technical concepts. This innovative approach has strengthened the university's reputation for quality education in these fields (Okeke & Nsukka, 2023).

Digital Portfolios, Online Polling Tools and Video Conferencing Tools: Digital portfolios enable students to collect and showcase their work, reflect on their learning, and receive feedback from educators and peers. Examples include Google Sites, Seesaw, and Word Press. While online polling tools allow educators to gather student feedback on specific topics or questions. Examples include Google Forms, Kahoot and Poll Everywhere. Video conferencing tools allow educators to facilitate virtual classroom sessions, provide remote instruction, and connect with students in remote locations. Examples include Google Meet, Microsoft Teams, and Zoom (Owan *et al*., 2023).

Interactive Whiteboards and Data Visualization Tools: Interactive whiteboards enable educators to present and annotate digital content, engage students in interactive activities, and collaborate with students in real-time. Examples include Google Jamboard, Promethean Active Panel, and SMART Board. While data visualization tools enable educators to analyze and present data in visual formats, such as graphs and charts, to gain insights into student performance and learning outcomes. Examples include Google Data Studio, Infogram, and Tableau (Owan *et al*., 2023).

Digital Assessment Tools and Social Media Platforms: Digital assessment tools provide educators with the ability to assess student knowledge and skills using a variety of question types, including multiple-choice, short answer, and essay. Examples include Edulastic, Exam View, and Google Forms. While social media platforms enable educators to connect with students, share learning resources, and promote student engagement in learning activities. Examples include Facebook, Instagram, and Twitter (Owan *et al*., 2023).

Ethical Challenges of Integrating AI Tools

Despite the robust transformative power of AI Technologies in teaching, learning and assessment methods in tertiary institutions in Nigeria, various ethical challenges hinder its integration and effectiveness. These are:

Data Privacy and Security Concerns: AI systems in education rely on the collection and processing of vast amounts of personal data, including students' academic records, personal details, and learning behaviours. Ensuring the privacy and security of this data is a critical ethical concern, particularly in Nigeria, where many tertiary institutions lack robust cyber security infrastructure (Olufemi, 2022). Without adequate protections,

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sensitive data could be exposed to breaches, leading to unauthorized access or misuse of personal information.

Data privacy concerns are exacerbated by the lack of clarity around data ownership. Many students and staff may not fully understand how their data is being used by AI systems, nor do they have control over how their data is processed and shared (Floridi, 2018). The ethical principle of informed consent is often overlooked, with students unknowingly providing data that may be used for purposes beyond their immediate educational needs (Ajadi, 2020). For instance, AI-powered learning management systems (LMS) collect student interaction data to provide personalized learning experiences. This poses risks related to how data is stored, shared, and processed. Nigerian data privacy laws, such as the Nigeria Data Protection Regulation (NDPR), offer a framework for ensuring data protection, but enforcement remains weak (Olufemi, 2022). In tertiary institutions, AI systems for tracking student achievement present privacy concerns (Zawacki-Richter *et al*., 2019). Institutions need robust frameworks that address the ethical challenges AI presents in educational settings (Floridi, 2018).

Digital Divide and Inequitable Access: AI technologies rely on digital infrastructure such as high-speed internet, electricity, and modern computing devices, yet many students and staff members in Nigeria, particularly in rural areas, lack access to these resources (Adebayo, 2020). As a result, AI tools designed to improve teaching, learning and assessment methods may only benefit those with reliable access to technology, widening the gap between privileged and underprivileged students. This inequity challenges the ethical principle of fairness and raises concerns about how AI may reinforce existing educational disparities (Emeje, 2021).

Bias and Fairness in AI Algorithms: AI systems are often trained on large datasets, and biases present in these datasets can be perpetuated in AI decision-making processes. In an educational setting, this could mean that certain student groups (e.g., those from underserved regions) might be unfairly disadvantaged. For instance, AI algorithms may incorrectly assess a student's learning needs or performance if the underlying training data fails to reflect the diverse experiences of Nigerian students (Buolamwini & Gebru, 2018). Biases in AI systems might lead to unjust outcomes (Johnson *et al*., 2020). Bias in AI systems can manifest in various ways, from unfair grading and assessment to biased allocation of resources such as scholarships or grants. Bias in AI can also extend to the allocation of educational resources, such as scholarships or research grants. Ensuring fairness in AI decision-making is critical to maintaining equity in tertiary education (Raji *et al*., 2020).

Transparency and Accountability Concerns: Transparency refers to the ability to understand how AI systems make decisions, while accountability relates to identifying who is responsible when AI-driven decisions result in harm. In tertiary institution,

educators and administrators must be able to interpret AI-generated recommendations regarding student performance. However, AI models are often opaque, making it difficult for non-specialists to comprehend their inner workings. This lack of transparency complicates accountability, especially when erroneous AI outputs lead to adverse outcomes, such as student misclassification or exclusion from learning opportunities (Lipton, 2018).In Nigerian tertiary institutions, where trust in institutional processes is already low, opaque AI systems may further erode confidence in educational decision-making (Okonjo, 2021).

Resistance to Change and Lack of Expertise: Another challenge to the ethical use of AI in Nigerian tertiary institutions is resistance to change and the lack of expertise in AI ethics and governance. Many educators and administrators are unfamiliar with the complexities of AI technologies, making it difficult to assess or manage the ethical risks associated with their use (Adebayo, 2020). As a result, tertiary institutions may adopt AI systems without adequate understanding of their ethical implications, leading to unintended negative consequences. Furthermore, resistance to change may stem from concerns about job displacement, as AI tools may automate certain tasks traditionally performed by educators, such as grading or providing feedback. Without proper training and support, staff members may resist AI adoption, further complicating efforts to implement AI ethically in Nigerian tertiary institutions (Olumuyiwa, 2022).

Conclusion and Recommendations

The integration of Artificial Intelligence (AI) in tertiary institutions has transformative potential, enhancing teaching, learning and assessment methods.AI-driven innovations can personalized learning, adaptive assessments, intelligent tutoring, automation of interactive activities, monitoring of students' progress, grading, essay scoring, attendance, formative assessment, engagement, prediction of future outcomes, enhance collaboration and communication, ensure accurate grammar, offer hands-on learning experiences, translate spoken content into multiple languages, identify students at-risk, offer online assessment, make abstract ideas more concrete, facilitate virtual classroom sessions, provide remote instruction, connect students with experts, share learning resources, ensure academic integrity, promoting original thinking and allows gamification-based learning to motivate and engage students.

However, ethical implications of integrating AI technologies are data privacy and security concerns; digital divide and inequitable access; bias and fairness in AI Algorithms; transparency and accountability concerns; resistance to change and lack of expertise. Addressing these challenges is crucial to ensure that AI is used ethically and effectively in teaching learning and assessment methods. On this note, the following recommendations were made:

1. Nigerian tertiary institutions must ensure compliance with data protection regulations such as the Nigeria Data Protection Regulation (NDPR), This can be achieved by investing in secure AI platforms, conducting regular audits, and providing training for staff and students on data privacy issues.
2. To mitigate bias, AI systems used in tertiary institutions should be trained on diverse datasets that reflect the experiences and backgrounds of Nigerian students and faculty. This requires collaboration between Nigerian tertiary institutions and AI developers to create contextually appropriate solutions.
3. AI systems should be designed to be interpretable, allowing educators, students, and administrators to understand how decisions are made. Institutions should also establish clear accountability structures to address situations where AI errors negatively impact learning.

References

Abanyam, N.L. &Agbo, M.O. (2019). Examination malpractice as a challenge to national development in Nigeria. *Benue Journal of Sociology*, 7 (1), 283- 295.

Adebayo, A. (2020). Challenges of digital learning in Nigerian higher education. *Nigerian Journal of Education Technology*, 12(2), 45-60.

Adiguzel, T., Kaya, M. H., &Cansu, F. K. (2023). Revolutionizing education with AI: Exploring the transformative potential of ChatGPT. *Contemporary Educational Technology,* 15(3), 429.https://doi.org/10.30935/cedtech/13152

Afonughe, E., Onah, E. N., Uzoma, A. C., Andor, S. E.&Orisakew, C. U. (2021). Integration of artificial intelligence too; (AI-Chatbot) into teaching and learning: A Panacea for improving universities educational and administrative duties in South-South Nigeria. *Journal of Science and System Biology,* 14(6), 1-6.

Ahmad, M., & Borno, H. (2023). Intelligent tutoring systems at the University of Maiduguri. *Nigerian Journal of STEM Education,* 6(1), 12-20.

Aina, M. A, Gbenga-Epebinu, Olofinibiyi, R. O., Ogidan, O. C. &Ayedun, T. O. (2023). Perception and acceptance of medical chatbot among undergraduates in Ekiti State University, Nigeria. *British Journal of Education,* 11(11), 1-14.

Ayala-Pazmino, M. (2023). Artificial intelligence in education: Exploring the potential benefits and risks. 593 *Digital Publisher CEIT*, 8(3), 892-899. https://doi.org/10.33386/593dp.2023.3.1827

Bassey, M. M. and Owushi, E. (2023). Adoption of Artificial Intelligence in Library and Information Science in the 21st Century: Assessing the Perceived Impacts and Challenges by Librarians in Akwalbom and Rivers States. *International Journal of Current Innovations in Education*, 6(1), 75-85.

Borbajo, N. M., Malbas, M. H.& Dacanay, L. R. (2023). Reforming education: The global impact of integrating artificial intelligence in the classroom environment. *American Journal of Language, Literacy and Learning in STEM Education, 1* (05), 16-27.

Buolamwini, J. &Gebru, T. (2018). Gender shades: Intersectional accuracy disparities in commercial gender classification. *Proceedings of Machine Learning Research*, 81(1), 77–91.

Cario de lasHeras, S., Kensington-Miller, B., Young, B., Gonzalez, V., Kruhne, U., Mansouri, S. S. &Baroutian, S. (2021). Benefits and challenges of a virtual laboratory in chemical and biochemical engineering: Students' experiences in fermentation. *Journal of Chemical Education*, 98(3), 866-875.

Caswell, C.J. &LaBrie, D.J. (2017). Inquiry based learning from the learner's point of view: A teacher candidate's success story. *Journal of Humanist. Math.* 7, 161–186. https://scholarship.claremont.edu/jhm/vol7/iss2/8/

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Cevikbas, M., & Kaiser, G. (2022). Promoting personalized learning in flipped classrooms: A systematic review study. *Sustainability*, 14(18), 11393.

Choudhury, L. K. (2022). Study on role of logic in AI 18 and problem solving using artificial intelligence. *Universal Research Reports*, 9(4), 282-290.

Connolly, C., Logue, P.A. & Calderon, A. (2023). Teaching about curriculum and assessment through inquiry and problem-based learning methodologies: An initial teacher education cross-institutional study. *Iris Education Studies*, 42, 443–460.

https://www.tandfonline.com/doi/full/10.1080/03323315.2021.2019083

Danziger, S. (2022). Intelligence as a social concept: a socio-technological interpretation of the turing test. *Philosophy & Technology*, 35(3), 68-75.

Dawes, S. (2023). How AI can deliver personalized learning and transform academic assessment. Available from

https://www.unisa.edu.au/connect/enterprise-magazine/articles/2023/how-ai-can-deliver personalized-learning-and transform-academic-assessment/

Delgado, H. O. K., de Azevedo Fay, A., Sebastiany, M. J.& Silva, A. D. C. (2020). Artificial intelligence adaptive learning tools. *BELT-Brazilian English Language Teaching Journal, 11*(2), e38749-e38749.

https://doi.org/10.15448/2178-3640.2020.2.38749

Dutta, S., Ranjan, S., Mishra, S., Sharma, V., Hewage, P., &Iwendi, C. (2024). Enhancing educational adaptability: A review and of AI-driven adaptive learning platforms. *4th International Conference on Innovative Practices in Technology and Management (ICIPTM)*, 1–10. https://doi.org/10.1155/2022/4750018

Edung, E. E. (2024). Application of Artificial intelligence and attainment of tertiary education goals: towards effective management of tertiary education in Cross River State, Nigeria. *Global Journal of Artificial Intelligence and Technology Development*, 2(2), 31-40.

Eli-Chukwu N. C., Igbokwe, I. C. & Ifebude, D. N. (2023). Challenges confronting e-learning in higher education institutions in Nigerian amid Covid-19. *Journal of Applied Research in Education*, 15 (1), 238-253.

Emeje, M. (2021). Digital inequities in Nigerian education: Implications for AI in learning. *African Journal of Education and Technology*, 10(1), 19-33.

Eneji,C.O.,Petters,J.S.,Esuabana,S.B.Onnoghen,N.U.,Udumo,B.O.,Ambe,B.A.,Essien,E.E.,Unimna,F.A.,Alawa, D.A.&Ikutal, A.(2022). University academic dishonesty and graduate quality for national development and global competitiveness: Nigerian Universities in Perspective. *International Journal of Learning, Teaching and Educational Research*, 21(5), 401-427.

Eze, I. (2022). Collaborative research in Africa: The role of AI. *Journal of African Higher Education Studies*, 3(2), 112-126.

Eze, S. C., Chinedu-Eze, V. C., & Bello, A. O. (2018). The utilization of e-learning facilities in theeducational delivery system of Nigeria: a study of M-University. *International Journal of Educational Technology in Higher Education*, 15(1), 43-56. https://doi.org/10.1186/s41239-018-0116-z

Fasola, O.S. (2024). Awareness, perception and use of Artificial Intelligence tools by LIS educators in Nigerian Higher institutions. *Cybrarians Journal*, 1(Issue 72), 1-20.

DOI:10.70000/cj.2024.72.591

Federal Republic of Nigeria (2014). *National Policy on Education*. 4th ed. Lagos: Nigerian Educational Research and Development Council.

Floridi, L. (2018). AI4 People-an ethical framework for a good AI society: opportunities, risks, principles, and recommendations. *Mind Q & Machines*, 28(4), 689-707.

Forero-Corba, W., &NegreBennasar, F. (2024). Techniques and applications of machine learning and artificial intelligence in education: a systematic review.https://doi.org/10.5944/ried.27.1.37491

Frankenfield, J, (2023). *Artificial Intelligence: What It Is and How It Is Used.* Retrieved fromhttps://www.investopedia.com/terms/a/artificial-intelligence-ai.asp on 19 April, 2024

Graesser, A. C., Li, H.& Fore, A. (2018). AI-based learning systems: Challenges and opportunities. *Journal of Educational Psychology*, 110(3), 351-363.

Harry, T., Chinyamurindi, W. T. &Mjoli, T. (2018). Perceptions of factors that affect employability amongst a sample of final-year students at a rural South African university. *South African Journal of Industrial Psychology*, 44(1), 1-10.

Hooda, M., Rana, C., Dahiya, O., Rizwan, A.& Hossain, M. S. (2022). Artificial intelligence for assessment and feedback to enhance student success in higher education. *Mathematical Problems in Engineering,* 2(1), 521-572

Hou, J., Li, Z., & Liu, G. (2022). Macro education approach to improve learning interest under thebackground of artificial intelligence. *Wireless Communications and Mobile Computing,* 2(22), 76-89.

Huang, X., Zou, D., Cheng, G., Chen, X., &Xie, H. (2023b). Trends, research issues and applications of artificial intelligence in language education. *Educational Technology & Society,* 26(1), 112-131. https://doi.org/10.30191/ETS.202301_26(1).0009

Huang, A. Y., Lu, O. H., & Yang, S. J. (2023a). Effects of artificial intelligence-enabled personalizedrecommendations on learners' learning engagement, motivation, and outcomes in a flipped classroom. *Computers & Education, 194*, 104684. https://doi.org/10.1016/j.compedu.2022.104684

Jaakkola, H., Henno, J., Makela, J., &Thalheim, B. (2019). Artificial intelligence yesterday, today and tomorrow. In 2019, *42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO),* 3, 860-867.

Johnson, R. (2022). Intelligent tutoring systems in electrical engineering education. *IEEE Transactions on Education*, 64(3), 235-241.

Johnson, A. M., Mejia, A., & Herron, T. (2020). Algorithmic bias and higher education: A brief introduction to the debate. *Journal of Educational Technology Development and Exchange*, 13(1), 85-100. https://doi.org/10.18785/jetde.1301.08

Johnson, L. (2023). AI and workload management in higher education. *Journal of Higher Education Studies,* 57(1), 101-117.

Kanyemba, K. Phiri, F., Munsanje, V.M. &Mwaanga O. (2023). Exploring the use of artificial intelligence in higher learning institutions: A case of David LivingstoneCollege of education. *Mulungushi University Multidisciplinary Journal,* 4(2), 2-13.

Karsenti, T. (2019). Artificial intelligence in education: The urgent need to prepare teachers for tomorrow'sschools. *Formation et Profession* [*Education and Profession*], 27(1), 112-116. https://doi.org/10.18162/fp.2019.a166.

Khan, I., Ahmad, A. R., Jabeur, N. & Mahdi, M. N. (2021). An artificial intelligence approach to monitor student performance and devise preventive measures. *Smart Learning Environments,* 8(1), 1-18.

Kuipers, M., & Prasad, R. (2022). Journey of Artificial Intelligence. *Wireless Personal Communications*, 1-16.

Kumar, N. S. (2019). Implementation of artificial intelligence in imparting education and evaluatingstudent performance. *Journal of Artificial Intelligence,* 1(01), 1-9.

Lavidas, K., Voulgari, I., Papadakis, S., Athanassopoulos, S., Anastasiou, A., Filippidi, A., Komis, V. &Karacapilidis, N. (2024). Determinants of humanities and social sciences students' intentions to use artificial intelligence applications for academic purposes. *Information*, 15(6), 314-324. https://doi.org/10.3390/info15060314

Lin, P. Y., Chai, C. S., Jong, M. S. Y., Dai, Y., Guo, Y.& Qin, J. (2021). Modelling the structural relationship among primary students' motivation to learn artificial intelligence. *Computers and Education: Artificial Intelligence,* 2, 100006. https://doi.org/ HYPERLINK "https://doi.org/10.1016/j.caeai.2020.100006"10.1016/j.caeai.2020.100006

Lipton, Z. C. (2018). The mythos of model interpretability. *ACM Queue*, 16(3), 31-57. https://doi.org/10.1145/3236386.

Luo, Y., Han, X., & Zhang, C. (2022). Prediction of learning outcomes with a machine learning algorithm based on online learning behavior data in blended courses. *Asia Pacific Education Review*, 4(1), 56-67.

https://doi.org/10.1007/s12564-022-09749-6.

Malik,P.K. (2024). The role of artificial intelligence in education: Opportunities and Challenges. *Indian Scientific Journal of Research in Engineering and Managemen*t, 9(4), 23-37. Doi: 10.55041/ijsrem35475.

Mena-Guacas, A. F., Urueia Rodríguez, J. A., Santana Trujillo, D. M., Gomez-Galaan, J., & Lopez-Meneses, E. (2023). Collaborative learning and skill development for educational growth of artificial intelligence: A systematic review. *Contemporary Educational Technology,* 15(3), 428.

https://\doi.org/10.30935/cedtech/13123

Mouchou, R., Laseinde, T., Jen, T.C.&Ukoba, K., (2021). Developments in the application of nano materials for photovoltaic solar cell design, based on industry 4.0 integration scheme. In *Advances in Artificial Intelligence, Software and Systems Engineering: Proceedings of the AHFE 2021 Virtual Conferences on Human Factors in Software and Systems Engineering, Artificial Intelligence and Social Computing, and Energy,* July 25-29,USA(pp. 510-521).Springer International Publishing.

Nazaretsky, T., Ariely, M., Cukurova, M.&Alexandron, G. (2022). Teachers' trust in AI-powered educational technology and a professional development program to improve it. *British Journal of Educational Technology,* 53(4), 914-931. https://doi.org/10.1111/bjet.13232

Nazari, N., Shabbir, M. S., &Setiawan, R. (2021). Application of artificial intelligence powered digital writing assistant in higher education: Randomized controlled trial. *Heliyon,* 7(5), 07014.https://doi.org/10.1016/j.heliyon.2021.e07014

Okeke, J.&Nsukka, U. (2023). Exploring virtual reality in Nigerian science education: A case study from UNN. *African Journal of Science Education*, 9(1), 30-42.

Okonjo, M. (2021). AI in Education: The covenant university experience. *Educational Technology Review*, 12(2), 90-104.

Ogunyemi, T. (2022). AI at NOUN: A pathway to accessibility and inclusivity. *Open University Review,* 8(2), 40-54.

Ogunleye, A. (2023). AI-Powered Chatbots: Transforming informal learning in Nigeria. *Journal of Educational Innovation*, 15(1), 60-72.

Ogunode, N. J. & Emmanuel, D. (2023). Human Resource Management in University System in Nigeria: Barriers and Possible Solutions. *Journal of Innovations in Social Sciences,* 3(3), 1-13.

Ogunode, N. J., &Ukozor, C. U. (2023). Curriculum revolution in higher education: The mighty role of Artificial Intelligence. *International Journal on Orange Technologies*, 5(10), 7-16.

https://ijins.umsida.ac.id/index.php/ijins/article/view/971/1183

Ogunode, N. J**,** Onaolapo, O., Onaolapo, O., Adeosun, F. I. &Ayoko, V. O (2023) Marketing of Public Universities in Nigeria. *Journal of Science, Research and Teaching,* 2, (2) 96-106.

Okolie, U.C., Nwosu, H.E., Eneje, B.N., et al. (2019b). Reclaiming education: Rising above examination malpractices and its contextual factors on study progress in Nigeria. *International Journal of Educational Development,* 65, 44–56.

Olayemi, A.O. &Oluwatoyin F. O. (2018). Quality of university education and employability of universities' graduates in Nigeria. *Journal of Education Review*, 10(1), 63-70.

Olufemi, O. (2022). Privacy regulations and AI implementation in Nigerian universities. *Journal of Information Systems and Technology*, 15(3), 45-58.

Olumuyiwa, B. (2022). Challenges of research funding in Nigerian higher education. *Nigerian Journal of Educational Development,* 10(2), 66-77.

Oluwadiya, K.S., Adeoti, A.O., Agodirin, S.O., Nottidge, T.E., Usman, M.I., Gali,M.B., Onyemaechi N.O., Ramat, A.M., Adedire, A.&Zakari, L.Y.(2023). Exploring artificial intelligence in the Nigerian medical educational space: an online cross- sectional study of perceptions, risks and benefitsamong students and lecturers from ten universities. *Niger Postgrad Med J*., 30(4), 285- 294. https://doi.org/10.4103/npmj.npmj_186_23

Ono, S.J. (2024).AI' Promise for teaching and learning. https://michigantoday.umich.edu/2024/03/21/ais-promise-for-teachingHYPERLINK"https://michigantoday.umich.edu/2024/03/21/ais-promise-for-teaching%20and-learning/#:~:text=While%20many%20higher%20education%20institutions,world%20to%20offer%20a%20custom"

O'Regan, G. (2021). *History of artificial intelligence***. In a** brief history of computing, 295-319. Cham: Springer International Publishing.

Owan, V. J., Abang, K. B., Idika, D. O., Etta, O. E., &Bassey, A. B. (2023). Exploring the potential of artificial intelligence tools in educational measurement and assessment. *Eurasia Journal of Mathematics, Science and Technology Education*, 19(8), 1-15.https://doi.org/10.29333/ejmste/13428 1

Owebor, K., Diemuodeke, O.E., Briggs, T.A., Eyenubo, O.J., Ogorure, O.J. &Ukoba, M.O. (2022). Multi-criteria optimization of integrated power systems for low-environmental impact. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, 44(2), 3459-3476.

Preston, J. (2020). Jill Watson, an AI Pioneer in Education, Turns 4. https://research.gatech.edu/jill-watson-ai-pioneer-education turns-4#:~:text=The%

Raheem, B. R., Anjum, F., &Ghafar, Z. N. (2023). Exploring the profound impact of artificial intelligence applications (Quillbot, Grammarly and ChatGPT) on English academic writing: A Systematic Review. *International Journal of Integrative Research (IJIR)*, 1(10), 599-622.

Raji, I. D., Bender, E. M., Lome, A.&Paullada, A. (2020). Closing the AI accountability gap: Defining an AI governance framework for fairer automated systems. *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, 29(1), 66.75.

Rajeshwari, M., & Krishna Prasad, K. (2020). IBM watson industry cognitive education methods. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 4(1), 38-50.

Ren, X. (2020). Artificial intelligence and depression: How AI powered chatbots in virtual reality games may reduce anxiety and depression levels. *Journal of Artificial Intelligence Practice,* 3(1), 48-58.

Richter, O. Z., Marín, V. I., Bond, M., &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,* 16(39), 4-27, DOI: 10.1186/s41239-019-0171-0.

Starr, N. (2024). U-M GPT's Maisey Tool Guides students to Success. https://michiganross.umich.edu/news/u-m-gpt-s-maisey-toolguides-students-success

Su, J., &Zhong, Y. (2022). Artificial Intelligence (AI) in early childhood education: Curriculum design and future directions. Computers and Education: *Artificial Intelligence*, 3, 00072.

https://doi.org/10.1016/j.caeai.2022.100072.

Succi, C. &Canovi, M. (2020). Soft skills to enhance graduate employability: Comparing students and employers' perceptions. *Studies in Higher Education*, 45(9), 1834–1847.

Sutton, R. S., &Barto, A. G. (2018). Reinforcement learning: An introduction. MIT Press.

Tzima, S., Styliadis, C.&Tsolakidis, C. (2020). Examining the impact of smart content creation in technology-enhanced learning environments. *Interactive Learning Environments*, 28(6), 755-769. https://doi.org/10.1080/10494820.2018.1552876

Usman, A, Samuel, A.O. &Hussaini, A.I. (2024). Student perspectives and impact of AI integration in pedagogical practices in Nigerian tertiary institutions. *Advance Mobile Learning Educational Research*, 4(2), 1135-1148, DOI: 10.25082/AMLER.2024.02.008

Usman, K. (2023). The role of AI in Nigerian tutoring systems. *West African Journal of Technology in Education,* 4(1), 59-70.

Walter, Y. (2024). Embracing the future of Artificial Intelligence in the classroom: The relevance of AI literacy, prompt engineering, and critical thinking in modern education. *International Journal of Educational Technology in Higher Education*, 21(1), 15-24. https://doi.org/10.1186/s41239-024-00448-3

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Xia, Q., Chiu, T. K. F, Lee, M., Temitayo I., Dai, Y., & Chai, C. S. (2022). A self-determination theory design approach for inclusive and diverse artificial intelligence (AI) K-12 education. *Computers & Education,* 189, 104582. https://doi.org/10.1016/j.

Xue, Y., & Wang, Y. (2022a). Artificial intelligence for education and teaching. *Wireless Communications and Mobile Computing*, 2, 1–10. https://doi.org/10.1155/2022/4750018

Yusuf A, Pervin N, Roman-Gonzalez M. (2024). Generative AI and the future of higher education: a threat to academic integrity or reformation? EvidMulticultPerspect. https://doi.org/10.1186/s41239-024-00453-6.

Zampirolli, F. A., BorovinaJosko, J. M., Venero, M. L. F., Kobayashi, G., Fraga, F. J., Goya, D., &Savegnago, H. R. (2021). An experience of automated assessment in a large-scale introduction programming course. *Computer Applications in Engineering Education,* 29(5), 1284–1299. https:// doi. org/ 10. 1002/ cae. 22385

Zawacki-Richter, O., Marín, V. I., Bond, M., &Gouverneur, F. (2019). "Systematic review of research on artificial intelligence applications in higher education: The future of learning". *International Journal of Educational Technology in Higher Education*, 16(39), 1-26.

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