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AI: IMPACT ON CURRICULUM IMPLEMENTATION IN HIGHER EDUCATION IN NIGERIA

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Abstract

The role of AI in the act of working out the plans and suggestions that have been made by curriculum experts in the classroom or school setting cannot be ignored. This study investigates the impact of artificial intelligence (AI) on curriculum implementation in Nigerian higher education. An overview of AI was examined with a description of the types of current Al technology. The role of AI in curriculum implementation in Nigerian higher education was also unfolded. Conclusions and recommendations were made. Governments should recognize the transformative potential of Al and entrust established agencies such as the National Agency for Research in Robotics and Artificial Intelligence (NARRAI) with the coordination and oversight of AI and robotics research endeavors.

Introduction

As the blue print for educational systems, the curriculum plays a pivotal role in fostering innovation. However, there is a growing recognition that curriculum innovation is imperative for bridging the gap between outdated educational practices and the evolving needs of contemporary learners. Recognizing the need for education to transcend spatial constraints, the integration of Al into curriculum development has emerged as a vital imperative.

Artificial intelligence (AI), characterized by machine learning algorithms, neural networks, and national language processing, represents an advanced technological paradigm that stimulates human intelligence. In the context of education, AI holds the promise of revolutionizing learning experiences.

Although the application of AI is still in its nascent stages in developing countries, such as Nigeria, its potential has already manifested in personalized learning experiences, real-time feedback mechanisms, and early detection of learning obstacles. In this regard, the critical role of AI in aligning educational practices with the demands of a rapidly evolving digital era is emphasized. As the dialogue on the intersection between AI and

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education gains momentum, acknowledging the dual nature of Al's impact—presenting both threats and opportunities—is crucial. However, the pandemic catalyzed a paradigm shift, with a remarkable percentage of educators advocating for the integral role of technology in education (Madhurijya, 2022). This shift underscores the need to reconsider traditional approaches to education and embrace the transformative potential of AI.

Overview of AI

Artificial intelligence is a field of computer science that focuses on developing systems capable of performing tasks that typically require human skills, such as visual perception, speech recognition, and decision-making (Russell & Norvig, 2016). According to Odunaya (2023), artificial intelligence (AI) stands as an advanced technological frontier, simulating human intelligence through machine learning algorithms, neural networks, and NLP.

AI has emerged as a potent force in educational management, revolutionizing the learning landscape. It enhances the learning process, improves student outcomes, and streamlines administrative tasks. Al represents a key driver of technological progress, reshaping societies and economies globally. AI focuses on designing an intelligent system that emulates human behavior associated with reasoning, language processing, perception, vision recognition, and spatial processing (Ocana et al., 2019).

The integration of Al into education signifies a paradigm shift, presenting opportunities for unprecedented advancements in the learning process and administrative efficiency. As AI becomes integral to educational systems, the implications for student engagement, personalized learning, and resource organization are substantial, promoting a future where technology plays a central role in shaping a more adaptive and effective educational landscape.

Similarly, AI empowers teachers and enhances effective and efficient teaching. Its purposes in education may be best served when it augments, rather than attempting to replace the teacher. As AI becomes more advanced and prevalent, the role of teachers will change, but the exact mechanism remains unclear. AI manifests in education in many ways, such as in discussion forum monitoring, human dual-teaching model where the two share responsibilities, including but not limited to providing instruction and empowerment of the teaching assistant to handle the more mundane tasks of teaching, such as taking attendance, grading, or answering general questions (Smith, 2023).

Key AI Technologies in Education

Scholars have extensively explored the applications of AI in education, highlighting its multifaceted impact. Machine vision, expert system, machine learning, natural language processing, deep learning, and robotics are among the major Al technologies instrumental in reshaping educational practices.

Machine vision (MV): MV, which is synonymous with computer vision, stands as a pivotal technology in the realm of artificial intelligence. Smith (2022) describes machine vision as a capability that empowers software to recognize patterns, make predictions, and adapt to unforeseen situations. This technology finds applications in video surveillance, facial recognition, biometric face scanning, automation driving, medical image analysts, and archeology

Automated Facial Recognition (FR): Streamlines the attendance process, thereby optimizing class time for both teachers and students while eliminating the need for manual cross-checking. The use of automated facial recognition coupled with machine vision not only streamlines administrative tasks but also contributes to a more efficient use of instructional time, fostering an environment conducive to focused and productive learning.

Expert System (ES): This represents a pivotal facet of artificial intelligence (AI), embodying the capacity of computer software to replicate human expertise within a specific domain facilitating problem solving through a

meticulously organized knowledge-based. Odunaya (2023) emphasized that this system functions as adept tutors, delivering personalized learning experiences by considering students' prior knowledge and abilities.

NLP: This stands at the intersection of AI and linguistic communication, focusing on emulating human natural language patterns. This technology facilitates interaction with intelligent systems using both written and spoken natural languages (Smith, 2022).

Machine learning (AML): This technology stands at the forefront of AI, encompassing the design, training, and deployment of models to applications, processes, and other machines. Odunaya (2023) delineated the core components of ML, including algorithms, application programming interfaces, development and training toolkits, data, and computing power. ML transforms information retrieval by automating suggestions and recommendations based on geographical location, search history, and user preferences, providing students and lecturers' access to a wealth of internet knowledge.

Deep learning (DL): This technology is synonymous with deep neural networks and represents a sophisticated facet of machine learning primarily utilized in pattern recognition and classification applications with substantial datasets. Singh and Singh (2021) assert that the incorporation of deep learning into online learning platforms presents a transformative potential, offering personalized learning experiences and reinforcing the role of technology in addressing individual learning needs.

Robotics: Robotics, which encompasses the design, construction, operation, and application of robots, represents a multifaceted science and technology domain. In the educational context, robots offer synchronous lessons to absent students, as exemplified by the technology of Avalarion connected to Microsoft Azure IoT Hubs. This facilitates full video and audio connections for students in hospitals or homes, allowing them to actively participate in the learning process through a table-controlled robot (Odunaya, 2023).

AI's role in curriculum implementation in Nigerian higher education

The deployment of AI in Nigerian higher education holds significant potential for enhancing various aspects of curriculum implementation. Lecture planning and preparation, which are crucial steps in curriculum delivery, are streamlined through AI's ability to automate routine tasks, such as lesson planning, scheduling attendance marking, grading, and record keeping (Ogunode & Adamu 2021). This automation not only reduces the administrative burden on academic staff but also allows educators to focus on improving educational quality. Additionally, AI tools can generate automated alerts, report cards, and communication with parents, fostering efficient communication channels (Odunaya, 2023).

Similarly, the preparation of instructional resources for effective lecture implementation is a responsibility often shouldered by academic staff. The role of AI in this sphere involves the creation of smart content, ranging from digital textbooks to instructional snippets and videos. AI tools can be used to create customized learning environments based on educational strategies and goals, including suggested reality/virtual reality, lessons, and web-based content. Monitoring and evaluation tools powered by artificial intelligence and machine learning algorithms help identify areas for curriculum improvement, ensuring that content aligns with diverse learning styles and effectively addresses areas of weakness.

Lecture presentation, a crucial aspect of curriculum implementation, is enhanced by artificial intelligence in tertiary institutions. The quality of teaching contents and methods has improved, adapting to the needs and capabilities of colleges and universities (Ohiare et al., 2021). Al contributes to the establishment of an AI literacy framework within the general education system, fostering general interest, sustainable development, and global governance among students.

The assessment of students, a responsibility often shouldered by lecturers, sees advancements via AI, particularly in the administration of online tests. AI automates the assessment and grading process, saving time

and ensuring objective evaluation (Oztok & Zingaro, 2019). Large datasets of student information, including assessment scores and behavioral patterns, can be analyzed by artificial intelligence (AI) to identify areas where students may be struggling, enabling targeted interventions. (Singh & Singh, 2021)

Lecturers can leverage AI to assign assignments to students' online, fostering student involvement in the curriculum. Smith (2022) underscored Al's capability to assist lecturers with the assignment process, facilitating the issuance and admission of online assignments by students.

Moreover, in monitoring student progress, AI has enabled lecturers to remotely monitor their students' learning trajectories, deliver personalized learning resources, and provide real-time guidance through intelligent teaching platforms. These platforms facilitate instinctive sessions between teachers and students, allowing personalized learning guidance based on data analysis of students' classroom learning (Zawack-Richard & Anderson, 2014).

The Logical Consequence of AI for Curriculum Development

The integration of AI in curriculum development presents profound logical consequences for the education landscape. AI technologies, such as machine learning and natural language processing, enable personalized learning experiences, automate assessment, and enhance learner engagement (Hussain 2018, Singh and Singh, 2021). The ability of AI to analyze student data contributes to the optimization of curriculum design and delivery, ensuring that educational content aligns with individual learning styles and needs. Moreover, the study highlights the role of AI in addressing scalability challenges and fostering dynamic curriculum development, emphasizing the need for an approach that considers learners' needs, relevant knowledge areas, and high-quality educational content (Ladeinde, 2019). These implications underscore the transformative potential of AI in shaping more adoptive, personalized, and data-driven curricula.

Conclusion

Curriculum changes are prompted by evolving societal needs, cultural shifts, and economic, social, and political dynamics. Technological advancement, such as the integration of AI, plays a vital role in reshaping curriculum implementation within tertiary education. This study explored the multifaceted contributions of Al in Nigerian tertiary institutions, emphasizing its impact on lecture planning, instructional resource preparation, presentation, student assessment script marking, assignment allocation, student preparation, and teaching method selection.

The paper also highlights the transformative potential of AI in streamlining administrative tasks, optimizing learning experiences, and fostering personalized education. Recognizing the indispensable role of AI in curriculum implementation, it is believed that it will continue to integrate advanced technologies, thereby contributing to the evolution and improvement of the educational landscape.

Recommendations

Based on the discussion so far, the following recommendations were made:

1. The government should recognize the transformative potential of AI and entrust established agencies, such as the National Agency for Research in Robotics and Artificial Intelligence (NARRAI), with the coordination and oversight of all AI and robotics research endeavors.
2. The government should also take various substantial steps, as illustrated by the formation of NARRAI, in developing a functional AI robot to further exemplify the country's individual initiative.
3. Stakeholders in education, management bodies, and the government should collectively demonstrate a comprehensive approach to integrate AI into the fabric of higher education in Nigeria, with far-reaching implications for curriculum development.
4. Employers of educators and school leaders should foster collaborative learning experiences among lecturers' by using mentorship programs and group activities to promote and enhance relatedness and sense of belonging among educators in curriculum planning.

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