

REPOSITIONING CURRICULUM AND INSTRUCTION IN THE ERA OF ARTIFICIAL INTELLIGENCE FOR NATIONAL DEVELOPMENT IN NIGERIA

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Abstract

The rapid advancement of Artificial Intelligence (AI) is transforming various sectors of society, including education. As digital technologies continue to reshape the global knowledge economy, educational systems must adapt to ensure that learners acquire the competencies required for the twenty-first century workforce. Curriculum and instruction represent critical components of educational reform, particularly in teacher education institutions responsible for preparing future educators. This paper examines the need to reposition curriculum and instructional practices in the era of Artificial Intelligence in order to promote national development in Nigeria. The study discusses the concept of Artificial Intelligence and its implications for education, the role of curriculum and instruction in technological transformation, and the emerging opportunities for integrating AI-driven pedagogical approaches into teaching and learning. The paper is anchored on Constructivist Learning Theory and the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasize active learning and effective technology integration in education. Empirical studies on Artificial Intelligence in education are reviewed to highlight the potential of AI tools such as intelligent tutoring systems, adaptive learning platforms, and learning analytics in enhancing instructional effectiveness. Despite the potential benefits of Artificial Intelligence in education, several challenges hinder its effective adoption in Nigeria, including inadequate technological infrastructure, insufficient digital competencies among educators, and limited policy support. The paper recommends curriculum reform, investment in digital infrastructure, professional development for teachers, and collaboration between educational institutions and technology industries. It concludes that repositioning curriculum and instruction to integrate Artificial Intelligence will enhance educational quality, improve workforce preparedness, and contribute significantly to national development.

Keywords: Artificial Intelligence, Curriculum Reform, Instructional Innovation, Teacher Education, National Development

Introduction

The twenty-first century has witnessed unprecedented technological advancements that have transformed social, economic, and educational systems across the world. Among these emerging technologies, Artificial Intelligence (AI) has attracted considerable attention due to its ability to perform tasks that typically require human intelligence such as reasoning, learning, decision-making, and pattern recognition (Stuart Russell & Peter Norvig, 2021).

The growing integration of Artificial Intelligence into different sectors of society has created new opportunities and challenges for educational systems. Education must therefore evolve to prepare learners for the demands of a knowledge-driven digital economy.

The assertion is supported by empirical research and global policy reports that document the impact of Artificial Intelligence on education and the labour market. For instance, the World Economic Forum (2023) reports that emerging technologies, particularly AI, are reshaping job roles and creating demand for new digital and cognitive skills. This shift requires educational systems to adapt their curricula to prepare learners for a knowledge-driven digital economy.

Similarly, UNESCO (2021) emphasizes that AI presents both opportunities, such as personalized learning and improved access to education, and challenges, including ethical concerns, inequality, and the need for teacher capacity development. These developments demonstrate that education systems must evolve to remain relevant.

Furthermore, scholarly studies (e.g., Andreas Schleicher, 2018) highlight that future-ready education should focus on critical thinking, problem-solving, and digital literacy, which are essential in an AI-driven economy.

According to UNESCO (2021), Artificial Intelligence can significantly improve the quality of education by supporting personalized learning, enhancing instructional delivery, and improving educational management systems. However, to realize these benefits, educational institutions must reform curriculum structures and instructional practices.

Teacher education institutions such as Colleges of Education in Nigeria play a vital role in preparing teachers who will shape the learning experiences of future generations. Unfortunately, many curricula and teaching approaches still rely heavily on traditional pedagogical models that do not adequately reflect the realities of the digital age.

Consequently, repositioning curriculum and instructional practices to integrate Artificial Intelligence has become a critical requirement for ensuring that Nigeria's education system contributes effectively to national development.

Concept of Artificial Intelligence

Artificial Intelligence refers to the capability of machines or computer systems to perform tasks that typically require human intelligence such as reasoning, learning, language processing, and decision-making (Russell & Norvig, 2021).

AI systems rely on algorithms, machine learning models, and large datasets to analyze information and generate insights. These technologies enable machines to simulate aspects of human cognition and perform complex analytical tasks.

In education, Artificial Intelligence involves the use of intelligent systems to enhance teaching, learning, and educational administration. Examples include intelligent tutoring systems, automated grading platforms, learning analytics tools, and educational chatbots.

Holmes, Bialik, and Fadel (2019) note that Artificial Intelligence in education can support both teachers and students by enabling personalized learning pathways and providing real-time feedback during learning activities.

Curriculum and Instruction in Contemporary Education

Curriculum refers to the organized set of learning experiences designed to achieve educational objectives. It includes the content, learning activities, instructional materials, and assessment strategies used in educational programmes. Instruction refers to the teaching methods and strategies used by educators to facilitate learning and help students achieve desired learning outcomes.

Effective education requires alignment between curriculum design and instructional practice. According to Ornstein and Hunkins (2018), curriculum must evolve continuously to reflect societal changes and technological advancements. In the era of Artificial Intelligence, curriculum must incorporate digital competencies such as computational thinking, data literacy, and technological problem-solving skills. Instructional strategies must also shift from teacher-centered approaches to learner-centered pedagogies that promote collaboration, creativity, and critical thinking.

Artificial Intelligence in Education

Artificial Intelligence technologies are increasingly being used to enhance teaching and learning processes. One major application of AI in education is adaptive learning systems. These systems analyze student performance data and adjust instructional materials according to individual learning needs (Luckin et al., 2018).

AI is also used in automated assessment systems, which enable rapid grading of assignments and provide immediate feedback to students. Another important application is learning analytics, which allows educators to analyze student learning data and identify patterns that can inform instructional decision-making.

AI-powered technologies such as virtual tutors, intelligent learning assistants, and predictive analytics systems are also becoming increasingly common in modern education systems.

Theoretical Framework

Constructivist Learning Theory

Constructivist theory posits that learners actively construct knowledge through meaningful interactions with their environment. Learning occurs when students engage in problem-solving activities and collaborative learning experiences. Artificial Intelligence technologies support constructivist learning by providing interactive and personalized learning environments.

Technological Pedagogical Content Knowledge (TPACK)

The TPACK framework highlights the importance of integrating technology, pedagogy, and subject content in effective teaching. Artificial Intelligence enhances the technological dimension of the TPACK framework by providing advanced tools that support innovative teaching methods.

Empirical Review

Research has shown that Artificial Intelligence technologies can significantly improve educational outcomes. Zawacki-Richter et al. (2019) found that AI applications in higher education are commonly used for adaptive learning, student support systems, and automated assessment.

Chen, Chen, and Lin (2020) reported that AI-based tutoring systems improve students' academic performance by providing personalized learning experiences. Similarly, Ouyang and Jiao (2021) observed that Artificial Intelligence technologies enable teachers to design more interactive and data-driven learning environments.

These studies demonstrate the potential of Artificial Intelligence to transform educational practices.

Conceptual Framework: AI-Driven Curriculum Transformation

The conceptual framework illustrates how Artificial Intelligence integration can transform curriculum and instructional practices leading to national development.

Conceptual Framework:

AI-Driven Curriculum Transformation for National Development

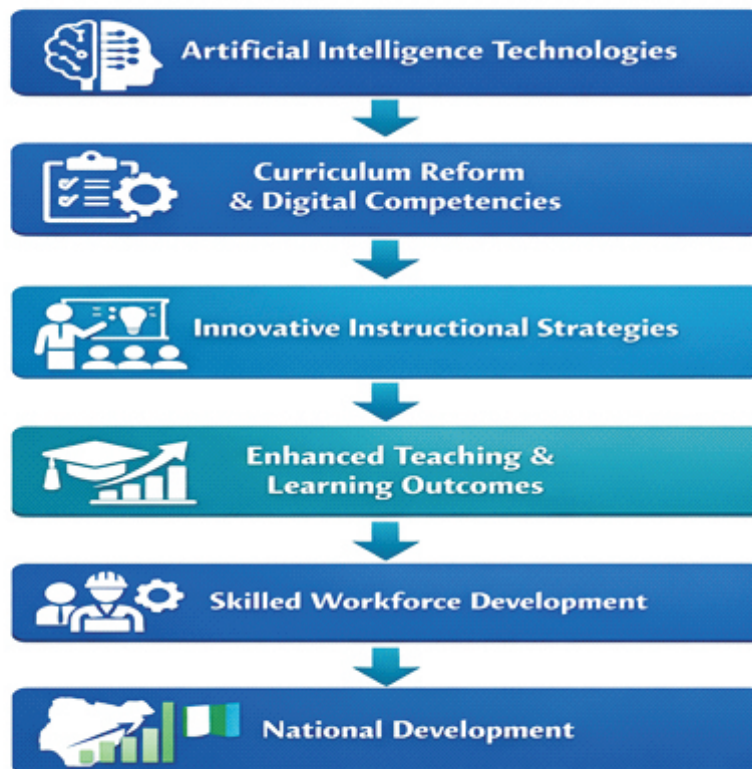


Figure 1: Conceptual Framework for Repositioning Curriculum and Instruction through Artificial Intelligence for National Development

Figure 1 illustrates the conceptual relationship between Artificial Intelligence integration in education and its contribution to national development. The framework presents a sequential process that explains how Artificial Intelligence can transform curriculum and instructional practices, leading to improved educational outcomes and national progress.

The framework begins with Artificial Intelligence technologies, which represent the foundational component of the model. Artificial Intelligence technologies include intelligent tutoring systems, adaptive learning platforms, educational chatbots, automated grading systems, and learning analytics tools. These technologies provide digital capabilities that enhance teaching, learning, and educational management processes.

The second component of the framework is curriculum reform and digital competencies. In order to effectively utilize Artificial Intelligence technologies, educational curricula must be redesigned to incorporate digital literacy, computational thinking, data literacy, and Artificial Intelligence awareness. Curriculum reform ensures that learners acquire relevant technological skills required in the modern knowledge economy.

The third stage in the framework involves innovative instructional strategies. With the integration of Artificial Intelligence into curriculum design, teachers are able to adopt new pedagogical approaches that enhance student engagement and participation. Such instructional strategies include personalized learning, problem-based learning, collaborative learning, and technology-supported instruction.

The fourth component is enhanced teaching and learning outcomes. Artificial Intelligence-supported

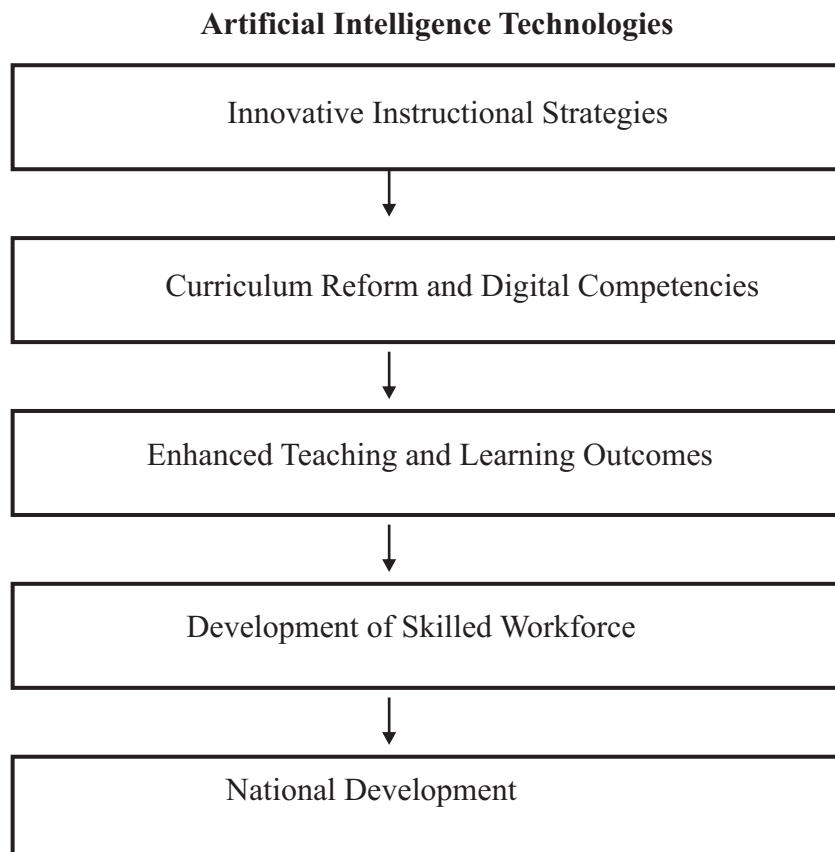
instructional practices improve the quality of education by providing personalized learning experiences, immediate feedback, and data-driven decision making. These improvements lead to better academic performance, increased student engagement, and more effective knowledge acquisition.

The fifth stage is skilled workforce development. When learners acquire digital competencies and critical thinking skills through AI-enhanced education, they become better prepared for employment in technologically advanced industries. A skilled workforce contributes to innovation, productivity, and economic competitiveness.

The final stage of the framework is national development. National development encompasses economic growth, technological advancement, improved productivity, and enhanced societal well-being. By transforming curriculum and instructional practices through Artificial Intelligence, educational institutions can produce graduates who possess the knowledge and skills required to drive national progress.

Overall, the framework demonstrates that integrating Artificial Intelligence into curriculum and instructional practices serves as a catalyst for educational transformation and national development. It highlights the interconnected relationship between technological innovation, educational reform, human capital development, and societal advancement.

The conceptual framework of this study illustrates how Artificial Intelligence integration can transform curriculum and instructional practices.



This framework suggests that the integration of Artificial Intelligence into curriculum and instruction leads to improved educational outcomes that ultimately contribute to national development.

AI–Curriculum Transformation Model

A practical model for repositioning curriculum and instruction in the era of Artificial Intelligence includes the following stages:

1. Curriculum Innovation

Introduce courses on Artificial Intelligence, data literacy, digital pedagogy, and computational thinking.

2. Teacher Capacity Development

Provide professional development programmes to equip teachers with AI-related digital skills.

3. Digital Infrastructure Development

Provide internet connectivity, digital laboratories, and AI-enabled learning platforms.

4. Industry Collaboration

Encourage partnerships between educational institutions and technology companies.

5. Continuous Evaluation

Monitor and evaluate the effectiveness of AI integration in teaching and learning.

AI Tools Used in Education

AI Tool	Educational Application
Intelligent Tutoring Systems	Provide personalized learning support
Adaptive Learning Platforms	Adjust content to individual learning needs
Educational Chatbots	Provide instant responses to student inquiries
Learning Analytics Systems	Analyze student performance data
Automated Grading Tools	Evaluate assignments and quizzes

These technologies enable more efficient and personalized learning experiences.

Challenges of AI Integration in Education

Despite its numerous benefits, several challenges hinder the adoption of Artificial Intelligence in Nigerian educational institutions.

These challenges include inadequate ICT infrastructure, insufficient funding, lack of trained personnel, and limited policy frameworks for AI integration. Addressing these challenges requires coordinated efforts from government, educational institutions, and technology stakeholders.

Conclusion

Artificial Intelligence represents one of the most transformative technologies of the modern era. Its integration into education offers enormous opportunities for improving teaching methods, enhancing learning outcomes, and promoting innovation. Repositioning curriculum and instructional practices to incorporate Artificial Intelligence is essential for preparing learners to function effectively in the digital age.

By integrating Artificial Intelligence into educational systems, Nigeria can develop a technologically competent workforce capable of driving sustainable national development.

Recommendations

- i. Curriculum designers should incorporate Artificial Intelligence concepts into teacher

education programmes.

- ii. Government should invest in ICT infrastructure in educational institutions.
- iii. Teacher training programmes should include digital literacy and AI-related competencies.
- iv. Educational institutions should establish AI research and innovation centers.
- v. Collaboration between academia and technology industries should be strengthened.

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