

## Re-Aligning Today's Curriculum to AI-Appreciating Education in the 21st Century

**Dr. Patience Ogadinma Emesiobi**

Department of Curriculum Studies, Faculty of Education, Ignatius Ajuru University of Education, Rumuolumeni,  
Port Harcourt, Rivers State, Nigeria

Email: [Patience.emesiobi@iaue.edu.ng](mailto:Patience.emesiobi@iaue.edu.ng); [emesiobipatience94@gmail.com](mailto:emesiobipatience94@gmail.com)

**Abstract:** *The most recent illustration of the substantial shift in educational learning objectives is one of the Sustainable Development Goals, which places an emphasis on instruction for international citizenship and environmentally conscious growth. The shift was born out of the understanding that educational systems need to provide students with decisive thinking, communication, solving problem and teamwork potential abilities. Curriculum reform and education of the 21st century places a strong emphasis on these, which have been bolstered by global conversations about changing societal and employment demands. This paper first examines the shift at the national, regional, and global levels. While focusing primarily on the issue of assessment, the study argues that any meaningful change in educational philosophy must ensure coherence across the domains of curriculum, pedagogy, and assessment. This paper outlined several barriers that keep artificial intelligence (AI) from being successfully implemented in full into research, teaching, and learning, despite the fact that AI has the prospective to completely change the educational system. This paper also identified some key methods for including AI proficiencies into the curriculum and concludes that the rapid changes in the global education landscape brought about by technological advancements, has made it imperative that current curricula be realigned toward education that appreciates artificial intelligence, thus the paper underlines the urgent need for curriculum reform that integrates AI capabilities, develops teacher capacity, and enhances technology infrastructure in order to get students ready for the rigors of today's AI-driven global economy.*

**Key words:** *Artificial Intelligent, Curriculum, AI-Appreciating Education, 21st Century*

### Introduction

Traditional curricula, which mainly emphasize material delivery, memorization, and subject-based training, are increasingly falling short of the expectations of an AI-driven society. Many educational institutions continue to dwell on industrial-era frameworks that value standardized testing and memorization over creativity, flexibility, inquiry, and digital competency. Taken for instance, it has been found that educational system worldwide is aligning with 21st-century abilities including decisive thinking, teamwork, and communiqué [1]. Without curriculum restructuring, students may not be equipped to work in environments where AI tools, data-rich workflows, and rapid change are standard. The development of new technologies and the processing capacity of sophisticated computers are directly related to the future of education.

Given the swift and intricate changes that education must adapt in the twenty-first century it is evident that a lot of nations with no exception to our nation (Nigeria) work hard to include the value of modern abilities into their educational policies and initiatives. While many countries use subject areas (such as social studies, science, and information and communications technology) to integrate and evaluate competencies like critical thinking, teamwork, and civic engagement, some are attempting to mainstream SDG 4.7 in the curricula using methods like project-based learning and

field studies. Globalization, technological advancement, and shifting workforce demands have made the goals of education shift from merely acquiring content knowledge to developing transferable abilities like decisive thinking, group effort, contact, creativeness, and digital literacy [2].

Furthermore, it has been established that curriculum design must include 21st-century skills in order to adequately equip citizens for a globalized digital age. Many countries now view curricula designed for an industrial age which emphasize standardized testing, isolated subject disciplines, and rote memorization as inadequate for preparing students for success in an uncertain, rapidly changing, and technologically advanced world [3]. AI has grown to be a major part of education in recent decades. Since in the 1950s, chemistry, biology, linguistics, mathematics, and the development of AI solutions have all had an impact on different theoretical interpretations of artificial intelligence.

AI is increasingly being used in formal and informal learning environments. These technologies include learning behavior analytics, intelligent tutoring systems (ITS), personalization algorithms, and adaptive learning systems. For example, studies have shown that AI systems can enhance student engagement, customize learning paths, and automate administrative tasks, all of which can change the nature of instruction and learning [4]. Studies show that integrating AI into higher education settings can boost efficiency, promote critical thinking, enhance student performance, and support innovative pedagogical models, however, it also calls into question teacher readiness, ethics and ethics [5]. All things considered, AI has a multifaceted impact on education because it changes how content is delivered, how assessments are made, how teachers and students interact, and it creates opportunities for more learner-centered, flexible, and data-driven approaches.

Given the sprouting nature of learning and the growing influence of artificial intelligence, it is an indispensable tool in realigning curricula to suit the demands of the digital era and the twenty-first century needs. Traditional curricula, which are centered on predetermined subject matter and teacher-led instruction, usually under-represent digital literacy, AI awareness, flexible skill development, and the ability to learn how to learn. Researchers have argued that curriculum reform is required to prepare students for evolving social and professional contexts and to integrate 21st-century skills like digital literacy [6]. This is evident that if AI technologies are used in education without corresponding curricular and pedagogical changes, their revolutionary potential is constrained. For instance, results will fall short of what education could be in the nearest future if the curriculum remains unyielding and prioritizes memorization over inquiry and application, even though AI technologies may make learning more personalized.

Artificial Intelligence (AI) and digital technologies are getting increasingly significant in the workplace and in education, but there are still significant problems with how curricula prepare students for this evolving environment. Despite the growing popularity of the term "digital skills," the specific skills required for meaningful AI engagement such as AI literacy, algorithmic awareness, data-driven thinking, and ethical AI usage are still not sufficiently incorporated into teaching, learning, and teacher preparation. Research has shown a positive correlation between digital competence and AI literacy, but many teachers lack the necessary AI-specific skills [7]. Similarly, studies carried out in elementary school settings found major barriers to the adoption of practical tools, systematic AI curricula, and AI outcome monitoring [8]. Students may be exposed to technology as a result, but they may not have strong foundations for using and understanding AI in meaningful, progressive ways.

This is due to the fact that school results frequently fall short of the skills needed in the twenty-first century. Studies show that curricula still emphasize traditional literacy and disciplinary knowledge while undervaluing abilities like creativity, teamwork, adaptability, and digital fluency. For instance, a research study of public secondary schools in Kenya found that the system places a greater emphasis on competitive exams and a lower value on 21st-century skills [9]. In the same vein

Sari et al., noted there is also evidence of a digital literacy gap that limits students' access to and meaningful use of emerging technologies, thereby widening the gap and lowering readiness. As a result, graduates may possess credentials but be ill-equipped to handle difficult social issues or thrive in fast-paced, AI-enhanced jobs in the future. To ensure that educational institutions go beyond traditional models, truly integrate AI and digital competencies, and match results with the actual demands of the twenty-first century, these issues collectively underscore the urgent need for curriculum re-alignment.

## **Methodology**

This is a qualitative descriptive study based on an extensive review and critique of the literature on curriculum re-alignment and AI in education; hence this study has adopted this method only. This study employs secondary data from peer-reviewed journal articles, books, policy documents, as well as international reports describing where the use of AI has transpired, the core ideas of curriculum development, and what competences belonging to the 21st century skills domain. A systematic selection process is used to discover literatures that match the scope of study in this paper, which are AI-appreciating education and curriculum transformation of century 21. The data analysed via thematic analysis in this paper reveals core trends across the themes of curriculum re-alignment, AI literacy, digital competencies, pedagogical innovation and assessment practices. In addition, findings are shaped along broad thematic areas including AI-enabled pedagogy, ethics, teacher preparedness, digital and technological infrastructure, and 21st century skills integration. Furthermore, it employs an interpretive analytical discussion of the connection between what constitutes curriculum structures and the changing dynamics associated with an AI-centred space of education. Comparative synthesis is used, too, to emphasize commonalities and divergences in the academic literature concerning AI assimilation and curricular change. This combination of methodology allows for greater understanding in how curricula, those written in traditional formats, can be adapted to both meet technological trends at an emerging rate and the globalization of education. Combining theoretical knowledge with recent research, the methodology builds a consistent framework to discuss challenges and to propose actionable repair solutions to better align education systems with AI-driven realities.

## **Result and Discussion**

### **The Concept of Curriculum Re-alignment**

Re-alignment involves not only adding "digital skills modules," but also reevaluating the curriculum's infrastructure, policy, teacher preparation, pedagogy, assessment, and structure in order to fulfill the requirements of the digital, AI-infused world. This provides the rationale behind the study's exploration of potential curriculum updates to support "AI-appreciating" education in the twenty-first century. Curriculum re-alignment is the logical progression of changing, reorganizing, or rearranging the elements of an educational programme to guarantee conformity and uniformity with contemporary societal demands aimed at developing competencies, technological trends, and international education standards. It is driven by the observation that curricula must continue to be dynamic in nature and responsive to the quickly sprouting educational environment. To make sure they meet the demands of current knowledge and future skill expectations, it comprises evaluating learning objectives, content, pedagogy, assessment techniques, and learning resources [10]. In the context of 21st-century education, curriculum re-alignment is essentially important for integrating technological competencies, creativity, critical thinking, and digital literacy into all educational levels' teaching and learning procedures. Scholars contend that curricula in educational systems need to be reoriented to take into account modern trends such as globalization, artificial intelligence, and shifting labor market demands. This will ensure that students are adequately equipped for both new

professional fields and complex societal demanded roles.

Another facet of realignment is ensuring lucidity both horizontally and vertically. Vertical alignment ensures learning progress across educational levels, whereas horizontal alignment ensures that content, evaluation, and instructional methods within a level are consistent and mutually beneficial. Thus, curriculum realignment enhances relevance, coherence, and efficacy. Researchers note that in order to enhance learning outcomes and global competitiveness, many African educational systems need to realign their curricula to incorporate technological innovations, especially AI and ICT integration. The misalignment between traditional learning models and the competencies required for the digital age has led to curriculum realignment as a strategic response in developing contexts such as Nigeria [11]. In summary, curriculum re-alignment is a deliberate restructuring process intended to enhance learning quality, revitalize curriculum relevance, and equip pupils for the challenges of a world that is changing.

### **The Concept Artificial Intelligence (AI)**

The creation of task-performing computer systems that conventionally require individual intellect, such as reasoning, learning, solving problem, perception, decision-making, language comprehension and judgment is known as artificial intelligence [12]. AI is the process of creating computer models and algorithms that let machines analyze massive amounts of data, identify trends, and reach well-informed conclusions or predictions. In short, artificial intelligence (AI) mimics human cognitive processes by using machine-based systems.

It can be divided into two major areas: General AI and narrow AI. Goertzel and Pennachin (2020) assert that general artificial intelligence is still a theoretical concept under active investigation. It would provide human-level flexibility and reasoning in a variety of domains. Narrow AI, which focuses on specific tasks like speech recognition, recommendation systems, or automated grading, is currently the most popular in a variety of industries, including education [13]. AI is powered by a number of underlying technologies, including robotics, natural language processing (NLP), machine learning (ML), and deep learning. While deep learning employs artificial neural networks to understand intricate data structures, machine learning allows computers to learn from data and enhance performance without explicit programming. Also, chatbots, automated writing and intelligent tutoring systems are made possible by Natural Language Processing (NLP), which permits communication between humans and machines through language comprehension. Real-time learner support, intelligent assessment tools, customized learning pathways, and administrative work automation are all made possible by AI in learning. It is a helpful tool for teaching and learning in the twenty-first century because of its capacity to modify lessons to meet the requirements of pupils [14]. Therefore, an understanding of AI is indispensable for educators, curriculum designers, and schools seeking to integrate educational institutions with the global digital shift.

### **Artificial Intelligence in Education (AIED)**

The use of AI technologies, such as machine learning, neural networks, natural language processing (NLP), and intelligent automation, to improve learning, teaching, assessment, and educational administration is known as artificial intelligence in education. AIED seeks to offer tailored, efficient, and data-driven learning opportunities by incorporating aspects of human intelligence into educational systems. AIED is a cutting-edge field that employs computational techniques to improve student engagement, automate teaching processes, and facilitate adaptive learning, [15]. Also, AI ED includes resources like intelligent tutoring programs, predictive analytics, and adaptive learning technologies [16].

The core tenet of AIED is that learning can be optimized when intelligent systems analyze student behavior and adapt their instruction accordingly. For instance, intelligent tutoring systems (ITS) use AI algorithms to identify misconceptions, provide detailed instructions, and provide individualized

feedback, just like human tutors do. These systems enhance mastery learning by adapting instructional content and levels of difficulty based on student performance patterns. AIED also includes learning analytics, which comprises collecting and analyzing educational information to forecast student performance, determine learning trends, and inform pedagogical decisions. This is why Siemens and Baker (2012) claim that instructors may identify at-risk pupils early and create focused interventions thanks to analytics-driven insights. For this reason, AIED is a helpful tool for evidence-based teaching.

Another important component of AIED is the use of natural language processing to support communication and research writing. AI-driven writing instruments that provide immediate feedback on grammar, coherence, originality, and structure can improve students' academic writing skills [17]. Chatbots and virtual assistants also support conversational learning by responding to student questions and providing on-demand academic support [18]. Furthermore, AIED boosts administrative efficiency and frees up By automating monotonous processes like grading and attendance monitoring, instructors may concentrate more on student engagement and innovative teaching [19]. These advantages position AIED to promote pedagogical innovation and educational change. All things considered, AIED is a novel approach that integrates intelligent technology into learning environments to improve learning opportunities, enable data-driven teaching decisions, and improve personalization.

### **21st-Century Skills Competencies**

Twenty-first century skills competences are the knowledge, abilities, attitudes, and dispositions that students need to successfully navigate today's complex, digitally advanced, and globally linked world. These skills stress critical thinking, creativity, digital literacy, teamwork, and socioemotional intelligence in addition to more traditional academic capabilities. These skills train students to meet the demands of contemporary professions and quickly changing social concerns. Critical thinking and problem-solving skills are essential to 21st-century competences because they allow students to assess evidence, examine data, and create creative solutions to urgent issues.

Another crucial element is cooperation and communication, particularly in digital and diverse contexts. Students need to be able to collaborate with individuals from a wide range of backgrounds and cultures and effectively convey their ideas on a number of platforms. These cross-cultural and interpersonal skills are becoming increasingly crucial in global labor markets. Digital literacy, which encompasses the capacity to communicate, use technology, and assess digital material safely online, is another crucial 21st-century skill. As work and education become more technologically mediated, learners must be able to navigate information-rich digital environments [20]. Digital literacy also includes knowledge of new technologies like artificial intelligence, data analytics, and cybersecurity. In addition, 21st-century frameworks place a strong emphasis on both personal and professional abilities like leadership, flexibility, self-direction, and accountability. Consequently, 21st-century talents are a variety of abilities that integrate intrapersonal, interpersonal, mental and technological abilities. These skills must be included in curricula if students are to thrive in an innovative, global society.

### **AI-Appreciating Education**

AI-Appreciating Education is an educational approach that helps students, teachers, and organizations understand, value, and successfully integrate Research, education, and learning processes can incorporate artificial intelligence (AI) technology, concepts, and practices. Fostering knowledge of AI's operations, revolutionary potential, and ethical implications in the classroom involves more than just utilizing digital tools. AI-appreciating education prioritizes AI literacy and AI-enabled pedagogy, ensuring that students learn how to interact with intelligent technologies and that instructors use AI to advance teaching and assessment [21]. The foundation of AI-appreciating

education is the understanding that modern education must change to accommodate global shifts in automation, data-driven decision-making, and personalized learning. Consequently, it highlights how educators and learners can perceive AI as a cooperative, innovative, problem-solving, and knowledge-generating collaborator [22]. This pedagogical approach encourages critical, ethical, and reflective engagement with AI to make sure that technology complements human judgment rather than replaces it.

### **AI-Appreciating Education**

The essential components of AI-Appreciating Education are as follows:

1. **AI Literacy:** AI literacy is the fundamental abilities and information needed to comprehend AI principles, constraints, and uses. It entails comprehending algorithms, machine learning, data ethics, and the societal implications of artificial intelligence [23]. AI-savvy students are better prepared to work in a world that is becoming more and more automated.
2. **AI-Enabled Pedagogy:** AI tools that are incorporated into teaching and learning in this aspect include automated feedback tools, Adaptive learning and intelligent tutoring systems, as well as AI-supported assessment. It enhances the efficacy of instruction, customization, and real-time student support.
3. **Ethical and Responsible AI Use:** Understanding ethical issues like data protection, algorithmic bias, transparency and appropriate student data usage is crucial in AI-valued education [24].
4. **Data-Driven Decision-Making:** AI systems leverage data to provide insights on learning needs, performance patterns, and student behavior. Curriculum design, intervention tactics, and institutional policies are all improved by data-driven pedagogical choices [25].
5. **Creative and Critical AI Engagement:** In addition to consuming AI solutions, students also develop, evaluate, and creatively apply them. This dimension encourages the growth of abilities such as invention, creativity, addressing problems and using computational thinking.

### **Problems of AI Integration in Education**

There are several barriers that keep artificial intelligence (AI) from being successfully implemented in full into teaching, and learning process despite the fact that AI has the prospective to completely change the educational system. These challenges comprise the following:

1. Limited Digital Skills and Teacher training in AI-enhanced pedagogy hinders many teachers' ability to successfully integrate AI into curricula.
2. Policy gaps and curriculum misalignment concerning AI standards, teacher qualifications, and evaluation systems hinder systemic integration.
3. Limitations dependable digital infrastructure, including computers, cloud services, and fast internet.
4. Data Security, Privacy, and Ethical Issues such as abuse, seclusion, and data protection may prevent adoption.
5. Budgetary constraints often result in experimental initiatives that are not long-term viable.

### **Methods for Including AI Proficiencies into the Curriculum**

Below are some strategies for Integrating AI Competencies into Curricula:

1. Scalable programmes for training teachers are necessary to furnish teachers by way of the pedagogical and technological know-how needed to teach AI.
2. Curriculum frameworks should specifically include courses on artificial intelligence (AI), such as robotics, natural language processing, machine learning principles, and data ethics.
3. Incorporating learning analytics dashboards, automated feedback systems, adaptive learning platforms, and intelligent tutoring systems into classroom activities can enhance competency development and individualized learning.
4. Ethical AI competencies ensure that teachers and students use AI responsibly while respecting

human-centered values.

5. AI competencies should be integrated into other fields rather than being restricted to computer science.
6. Students can obtain practical experience with AI applications by collaborating with EdTech companies, industry partners, and AI researchers.
7. Reliable digital infrastructure, including devices, cloud services, internet connectivity, and AI laboratories, is essential for the successful integration of AI skills.
8. Governments and educational institutions must create policies that specify AI learning standards, competencies, assessment procedures, and instructor certifications.

## Conclusion

The rapid changes in the global education landscape brought about by technological advancements, has made it imperative that current curricula be realigned toward education that appreciates artificial intelligence in the twenty-first century. Particularly in developing countries like Nigeria, many educational systems continue to employ old-fashioned pedagogical frameworks that are out of step with the demands of the digital age. The digital literacy required to use AI-enhanced products is often lacking among educators and learners, thus memorization is given precedence over the personalized, interactive, and technologically sophisticated methods that AI enables in current teaching strategies. Regional and global reforms highlighted show assessment where national curriculum frameworks are already including digital transformation and AI literacy programmes across the globe. These examples serve as useful benchmarks for our educational systems to update their curricula. Sequel to these, this paper underlines the urgent need for curriculum reform that integrates AI capabilities, develops teacher capacity, and enhances technology infrastructure to get pupils ready for the hassle of the AI-driven global economy.

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