EVALUATING THE IMPACT OF ARTIFICIAL INTELLIGENCE ON IMPLEMENTATION OF ECONOMICS PROGRAMME IN SECONDARY SCHOOLS IN NASARAWA STATE, NIGERIA

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Abstract

The study evaluates the impact of artificial intelligence on the implementation of Economics programme in secondary schools in Nasarawa State. The study concluded that enhancement of teaching and learning through personalized instruction, improvement in curriculum delivery and resource accessibility, support for data-driven decision making in teaching and assessment, and promotion of administrative efficiency and educational planning are the artificial intelligence on the implementation of Economics programme in secondary schools in Nasarawa State. The study also revealed that inadequate infrastructure, limited access to advanced technology, resistance to change, language barrier, cost of implementation, inadequate trained personnel and ethical considerations are the problems of deploying Artificial Intelligence for the implementation of Economics Programme in Secondary Schools in Nasarawa State. Based on the findings, suggestions were made that the Nasarawa State Ministry of Education should incorporate Artificial Intelligence concepts and tools into the secondary school curriculum, particularly in Economics Education. Continuous professional development programmes should be organized to train Economics teachers on the use of AI tools and digital technologies in classroom instruction. Teachers need to be equipped with practical skills to use intelligent tutoring systems, online learning platforms, and data analytics software for teaching Economics concepts effectively. Government should invest in improving ICT infrastructure in secondary schools to support AI adoption. The government should collaborate with private technology firms, non-governmental organizations, and international development partners to fund and implement AI-based educational projects. Such partnerships can help provide resources, technical expertise, and mentorship programmes that promote the use of AI in economics teaching and learning among other suggestions.

Keywords: Evaluating, Artificial intelligence, Economics programme, Secondary schools

Introduction

In recent years, Artificial Intelligence (AI) has appeared as a transformative force in the global education sector, redesigning the way teaching and learning are conducted. In Nigeria, the integration of AI into secondary schools education presents new opportunities and challenges, particularly in the implementation of Economics programmes. Economics education, which aims to equip students with analytical, decision-making, and problem-solving skills, can benefit immensely from AI tools that personalize learning, enhance access to information, and promote data-driven teaching practices.

AI technologies such as intelligent tutoring systems, virtual classrooms, data analytics, and automated assessments have the potential to revolutionize the teaching of Economics by providing students with interactive learning experiences and real-time feedback. For teachers, AI offers innovative ways to design lessons, monitor students' progress, and improve

curriculum delivery (Okeke & Eze, 2022). However, despite these advantages, the effective implementation of AI in

Nigerian secondary schools faces significant barriers such as inadequate infrastructure, limited teacher training, poor funding, and lack of digital literacy among educators and learners (Aina, 2021; Adewale, 2024).

The impact of artificial intelligence on the implementation of Economics education programmes in secondary schools is therefore twofold: it offers prospects for improved efficiency and learner engagement, but it also exposes systemic weaknesses in Nigeria's education system (Ogunode, 2025). Understanding this impact is essential for policymakers, educators, and school administrators to harness the benefits of AI while addressing the challenges that hinder its adoption. This study, therefore, seeks to evaluate the impact of artificial intelligence on the implementation of Economics programme in secondary schools in Nasarawa State, focusing on how AI influences teaching effectiveness, curriculum delivery, and students' learning outcomes in Economics Education.

Literature Review

Concept of Artificial Intelligence

Artificial Intelligence is "the science and engineering of making intelligent machines, especially intelligent computer programs, that are capable of performing tasks that require humanlike intelligence such as reasoning, learning, perception, and problem-solving." This definition highlights AI as a multidisciplinary field that combines computer science, mathematics, and cognitive psychology to simulate human intelligence (Russell & Norvig 2021). AI is computer systems that can learn from data, recognize patterns, make decisions, solve problems, and sometimes even create new content without being explicitly programmed for every single step. AI is therefore 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). These activities involve problem-solving, acquiring knowledge, comprehending language, and seeing visual information. AI has become increasingly prominent in recent years, bringing about a revolutionary transformation in the methods by which jobs are completed in numerous businesses. Within the realm of education, AI offers a multitude of possibilities to augment the learning process. Intelligent systems provide the ability to adjust to the specific requirements of each learner, deliver tailored learning experiences, and provide immediate feedback (Adigun et al., 2023). AI applications in education encompass adaptive learning platforms, intelligent tutoring systems, and virtual simulations. Through the use of artificial intelligence, educators have the ability to construct dynamic and interactive learning environments that accommodate the various learning styles and capabilities of students. AI can help conduct fair exams with the use of AI-powered remote proctoring. With its help, school authorities can easily conduct exams for remote learners. The authorities can prevent cheating during exams by analysing the images/video streams produced by AI proctors. These proctors keep an eye on the candidate by detecting voices or the presence of another person apart from the examinee (Holmes et al, 2019).

According to UNESCO (2021), Artificial Intelligence refers to "computer systems that can perform tasks that normally require human intelligence, such as learning, reasoning, problem solving, perception, and language understanding, with potential applications in education, health, and governance." This definition emphasizes AI as a transformative tool for sustainable development, particularly in improving teaching, learning, and educational administration. Artificial Intelligence (AI) has emerged as a transformative force across various sectors, offering innovative solutions to complex problems. In the realm of education, AI holds the potential to revolutionize traditional teaching methods and streamline research

processes. Artificial Intelligence refers to the development of computer systems capable of performing tasks that typically require human intelligence. This includes a range of technologies, including machine learning, natural language processing, and data analytics. AI systems leverage algorithms and data to simulate cognitive functions, enabling machines to analyze information, adapt to changing circumstances, and improve performance over time (Russell & Norvig, 2010). AI can potentially revolutionize the crime management of school system to be more effective. With the increasing in the rate of criminalities in the tertiary institutions and other threats, institutions are challenged to implement new and innovative ways to protect students and staff. AI technology offers a variety of solutions that can help tertiary institutions to improve their safety and security measures and enhance their overall emergency preparedness (Sadulski, 2024). AI ensures data veracity is crucial to maintaining accuracy and integrity when working with educational data. With the increasing digitization of educational processes, enormous amounts of data are generated, including student performance metrics, learning activities, assessments, and more (Singh,& Jain, 2022;Olusegun & Honmane, 2024). It is based on this that this paper discussed how AI can be used to enhance crime management of secondary and tertiary institutions in Nigeria.

Concept of Economics Programme

The World Bank (2019) defines an Economics Programme as “a coordinated set of government policies, institutional reforms, and planned actions designed to achieve macroeconomic stability, promote growth, and enhance living standards.” This definition underscores the structured and goal-oriented nature of Economic programmes as tools for economic planning and development.

Olatunji and Adebayo (2021) describe an Economics Programme in the educational context as “a structured learning plan aimed at equipping students with economic knowledge, analytical skills, and entrepreneurial competencies necessary for understanding and participating in the economy.” This definition relates directly to economics education, highlighting its goal of preparing learners for productive engagement in economic and financial decision-making.

According to the World Bank (2019), an Economics programme refers to “a set of coordinated policies, plans, and actions implemented by governments or institutions to stimulate economic growth, enhance productivity, and improve living standards.” This definition emphasizes the role of systematic planning and policy execution in achieving sustainable economic development and social welfare. The IMF (2020) defines an Economics programme as “a comprehensive framework of fiscal, monetary, and structural policies designed to correct macroeconomic imbalances and promote stability and growth.” This definition highlights the macroeconomic dimension, focusing on stabilization and reform processes aimed at improving a nation’s economic performance. Adu et al. (2012) put forward the identified reasons for the studying of Economics: 1) the study of Economics enables a student to understand the nature of the complexity of the economic activities in which he is only a very small part. 2) It enables students to understand and appreciate various government polices where choices have to be made such as probably to spend more money on free education and therefore provide less employment opportunities. 3) The study of Economics provides the students with basic skills for analysing Economics problems thereby preparing them better for positions where economic decisions have to be made. 4) The study of Economics helps a government to promote growth and development therefore improving the quality of life of the citizens. 5) Knowledge of Economics is useful to analyse fascinating patterns of socio-economic behaviour. 6) The study of Economics is useful to understand and alter the inequalities in the distribution of income and opportunities. Noun (2006) observed that the

significance of Economics Education to any nation is very alarming. It enables both leaders and citizens to understand basic economics concepts, principles as well as to understand, appreciate and seek to improve the economic situation for their own social good. The understanding of Economics is a pre-requisite for good citizenship. To the researcher, the principal objective for teaching Economics should be “to provide economic understanding necessary for responsible citizenship”. Being a responsible citizen involves the ability to take rational decision on important economic issues with a good basis for doing so. Obemeata (1991) observed that the position of Economics in secondary school curriculum has been strengthened because it has been accepted that it has some civil values because of some topics as “the element and determinants of national income, the structure and activities of labour unions, the working and influence of financial institution unemployment, production and distribution” (in Akin-Ibidiran, Ogunode. & Ibidiran 2021).

Method

The paper is a position paper that adopted a systematic literature review-based method. The method allows collecting and reviewing the related previous literature from various online sources. With the aid of digital platform, the researcher collected secondary information to generate knowledge on this topic. The position paper followed qualitative narrative design method. The researcher has visited different online sites to collect the previous literature and analyse the impact of artificial intelligence on the implementation of Economics programme in secondary schools in Nasarawa State, Nigeria. The previous findings are critically analysed and presented in different themes as on the impact of artificial intelligence on the implementation of Economics programme in secondary schools in Nasaraw State.

Result and Discussion

Artificial Intelligence (AI) has begun to reshape the global educational landscape, offering innovative solutions for effective teaching, learning, and administration. In the Nigerian context, integrating AI into the implementation of Economics programme can transform how Economics is taught and learned by enhancing instructional delivery, improving curriculum management, and fostering personalized learning experiences. However, these benefits depend on the availability of infrastructure, teacher competence, and institutional readiness. The following are four major impact of AI on the implementation of Economics programme in secondary schools. The use of AI technology has revolutionized the education system in Nigeria by enhancing the teaching and learning process through personalized instruction.

Enhancement of Teaching and Learning through Personalized Instruction

AI enables personalized learning experiences by analysing students’ performance data and adapting instructional content to meet individual needs. Intelligent tutoring systems and adaptive learning platforms can help Economics teachers identify students’ strengths and weaknesses, allowing them to tailor lessons accordingly. This approach increases student engagement and understanding of complex Economics concepts such as demand and supply, inflation, population, income determination, labour force or market structures. UNESCO (2021) maintains that AI-powered systems enhance learner-centered education by promoting individualized instruction and continuous feedback, which improve academic outcomes. AI has revolutionized the education system by enhancing teaching and learning through personalized instruction in Economics programme in schools (Ogunode, & Ejike, 2023). By utilizing advanced algorithms, AI technology is able to analyse individual students' learning styles and preferences, as well as their strengths and weaknesses in Economics concepts. This allows for the creation of personalized lesson plans and instructional materials that cater to the specific needs of each student. Furthermore, AI is able to track and monitor students' progress and provide targeted feedback, allowing for continuous improvement and

a more efficient learning experience. With the help of AI, teachers are able to provide customized instruction that maximizes student engagement and facilitates a deeper understanding of economic principles. This leads to improved academic performance and ultimately prepares students for success in the field of Economics. AI has truly transformed traditional teaching methods and has greatly enhanced the learning experience for students in economic programmes.

Improvement in Curriculum Delivery and Resource Accessibility

Artificial Intelligence facilitates easier access to educational materials and online resources that support the implementation of economic programmes. Teachers and students can use AI-driven tools such as digital libraries, data visualization software, and economic simulators to explore real time economic data and case studies. This strengthens the link between classroom learning and real-world applications. Aina (2021) found that AI and digital learning tools enhance the teaching of Economics by providing interactive simulations that make abstract concepts more practical and relevant. AI has greatly improved the delivery of curriculum and accessibility of resources in economic programmes in schools. By incorporating advanced technologies such as machine learning and natural language processing, Ogunode and Olowonefa (2023) noted that AI has enabled teachers to create more dynamic and personalized curriculum that caters to the specific needs of their students. This has resulted in a more engaging and effective learning experience for students, leading to better academic performance. AI has helped to make resources more accessible in economic programmes. With the use of AI-powered tools, teachers can quickly and accurately generate abstracts and summaries of academic materials, making it easier for students to understand complex concepts. Additionally, Eli-Chukwu et al, (2023) observed that AI has enabled the creation of digital platforms where students can access a wide range of educational resources, including interactive simulations and virtual experiments, at any time and from any location. AI has also improved the overall efficiency of curriculum delivery in economic programmes. With the help of AI, teachers can identify knowledge gaps and areas of improvement in students' learning, allowing them to provide targeted and timely interventions. This has not only improved students' understanding of the subject but also helped to optimize the use of resources and time.

Support for Data-Driven Decision Making in Teaching and Assessment

AI systems provide teachers with analytical insights into students' performance, helping them make informed decisions on teaching strategies, assessment methods, and curriculum improvement. Automated grading systems, learning analytics, and predictive algorithms enable teachers to monitor students' progress more efficiently. For Economics programme, this means teachers can evaluate students' comprehension of topics like fiscal policy, monetary systems, and entrepreneurship with greater accuracy. **Okeke and Eze (2022)** noted that AI-based assessment tools improve teaching effectiveness by reducing teachers' workload and allowing more time for instructional planning. An AI-supported approach to data-driven decision making in teaching and assessment is essential in modern schools, particularly in the context of economics programmes. With the growing influence of technology in education, teachers and school administrators can benefit greatly from using AI tools to improve their decision-making processes (Holmes et al, 2019). Through the use of advanced algorithms and data analysis techniques, AI can help educators gather and analyse data in a fraction of the time it would take manually. By inputting information related to the economics programme within a particular school, this tool generates an academic abstract that highlights key insights and trends, ultimately aiding in more informed decision-making. For example, AI can analyse students' performance data to identify areas of improvement within the

economics programme. It can also offer personalized recommendations for teaching strategies and assessment methods based on the unique needs and learning styles of each student. This way, educators can tailor their approach to best support student learning and success (Olusegun, & Honmane, 2024). AI can also analyse data on economic trends and developments, providing valuable insights that can guide curriculum design and teaching methods. By identifying patterns and connections between Economics concepts and real-world applications, educators can ensure that their teaching is relevant and up-to-date (Ogunode, & Ukozor 2023).

Promotion of Administrative Efficiency and Educational Planning

AI also impacts the administrative side of education by improving school management and policy implementation. AI applications such as data management systems, attendance tracking, and performance monitoring enhance efficiency in resource allocation and programmes evaluation. For economics programmes, AI helps education administrators track funding utilization, teacher training needs, and students' performance trends. World Bank (2020) emphasized that AI driven management systems contribute to transparency, accountability, and effective decision making in educational institutions, thereby improving programmes implementation. The use of AI in schools has significantly contributed to the promotion of administrative efficiency and educational planning in economics programmes. With its advanced algorithms and data analysis capabilities, AI has revolutionized the way schools plan and implement their economic programmes. By analysing large amounts of data such as students' performance, attendance records, and resource utilization, AI can generate comprehensive and accurate academic abstracts that provide valuable insights for school administrators and educators (Ogunode, Edinoh, & Chinedu, 2023). Through the use of AI, schools are able to identify patterns and trends in students and school data, which can inform decision-making and resource allocation. This has led to more efficient administrative processes, as well as more effective educational planning. With AI-generated abstracts, schools can easily identify areas of improvement, set achievable goals, and track progress towards those goals (Oluyemisi, 2023). This not only saves time and resources, but also ensures that schools are constantly evolving and adapting to the needs of their students. AI can also help schools identify at-risk students and provide personalized interventions to support their academic success. By analysing data on students' performance and behaviour, AI can flag students who may be struggling or at risk of falling behind. This allows schools to intervene early and provide targeted support, improving the overall success rate of their economics programmes (Onete, Akpama, Egong & Okey, 2012).

Problems of Deploying AI for the Implementation of Economics Programmes in Secondary Schools in Nasarawa State, Nigeria

Inadequate Infrastructure

The deployment of artificial intelligence in secondary schools in Nasarawa State faces the challenge of inadequate infrastructure such as internet connectivity, computers, and power supply. AI systems even simple classroom assistants or adaptive learning tools — require stable electricity, sufficient bandwidth, and devices (tablets/PCs/smartphones) for students and teachers. In many secondary schools in Nasarawa State (especially rural and low-resource urban schools) intermittent power, limited classroom ICT labs, and poor broadband make it impossible to run cloud-based AI services, sync student data, or sustain devices (charging, updates, backups). This widens inequality, schools with basic infrastructure can pilot AI while others are left behind.

Limited Access to Advanced Technology

Secondary schools in Nasarawa State often lack access to advanced technology needed for effective implementation of economic programmes using AI. This includes specialized software and tools, as well as trained personnel. Meaningful AI (natural language models, adaptive tutors, and predictive analytics) can require modern servers, GPUs or well-managed cloud services, plus up-to-date software stacks and localized models. Schools and many education ministries lack the procurement, maintenance and technical support to host, update or afford these technologies. As a result, any AI deployed is often rudimentary, centralized (not tailored to classroom needs), or vendor-locked—reducing pedagogical impact (Okeke et al , 2022; Chigbundu et al, 2023)

Resistance to Change

There may be resistance from teachers and stakeholders who are not familiar with AI technology or are hesitant to accept new methods of teaching. Teachers and school leaders may resist AI adoption because of fear of increased workload, concerns about deskilling or job displacement, scepticism about educational value, or simply unfamiliarity. Without leadership, incentives, and time for teachers to learn and experiment, AI tools remain under-used or are used only for administrative tasks rather than transforming teaching and learning. Successful adoption requires change management, demonstration pilots, and teacher involvement in design (Oluyemisi, 2023)).

Language Barrier

The use of AI in implementing economic programmes in secondary schools may face obstacles due to language differences. The majority of students in Nasarawa State speak local dialects and may not be fluent in English, which is the primary language used in AI programming. Nasarawa State is multilingual and many students learn in languages other than English at early levels. Most commercial AI models and tech content are developed in English or other major world languages; they often do not support Nigerian languages or local curricular examples. AI systems that cannot understand students' language, local economic contexts, or curriculum specifics will produce low-quality feedback, misinterpret responses, or fail to engage learners—particularly disadvantaged learners. Localizing models and datasets is costly and technically challenging (Olusegun, et al 2024).

Cost of Implementation

The cost of implementing AI technology in secondary schools can be a major hurdle, especially for low-income schools. The purchase and maintenance of advanced technology can be expensive, making it difficult for schools to afford. AI deployment involves capital costs (devices, networking, compute or cloud fees), recurrent costs (data plans, electricity, maintenance, licences), plus costs for capacity building. Many schools in Nasarawa State operate on tight budgets and depend on short-term donor projects; without sustainable financing (government budgets, PPPs, long-term procurement strategies) pilots cannot scale and are often discontinued. Cost-effective, low bandwidth approaches and lifecycle budgeting are essential but often missing (Chigbundu et al, 2023)

Inadequate Trained Personnel

The successful deployment of AI technology in schools requires trained personnel who have in-depth knowledge and expertise in this field. However, there is a shortage of AI professionals in Nasarawa State secondary schools, making it challenging to find qualified individuals to lead and manage these programs. AI systems need technical staff for deployment and maintenance (IT admins, data engineers) and teachers/subject specialists who can design AI-mediated lessons and interpret AI outputs. Reports show high proportions of teachers in secondary schools in Nasarawa State lack digital literacy and there is a

shortage of trained educational technologists. This skills gap leads to poor configuration, misinterpretation of AI recommendations, low uptake, and risks from mismanaged students' data (World Bank 2020).

Ethical Considerations:

The implementation of AI in secondary schools raises ethical concerns as it involves the collection and processing of personal data of students. This can lead to privacy and security breaches if not handled properly, and may also raise issues related to discrimination and bias in the AI algorithms used. AI raises serious ethical questions in schools: collection and storage of minors' personal data, lack of data-protection safeguards, algorithmic bias that can reinforce socio-economic inequalities, opaque decision-making (who is accountable when an AI gives harmful advice?), and potential misuse (surveillance, profiling). Nigeria currently has evolving policy frameworks for AI/ data protection; absence of clear, enforceable safeguards in school contexts risks harm and undermines trust. Any deployment must include privacy-by-design, consent mechanisms for minors, bias audits, and governance frameworks. (Ogunode, et al 2023)

Funding

The study revealed that enhancement of teaching and learning through personalized instruction, improvement in curriculum delivery and resource accessibility, support for data driven decision making in teaching and assessment and promotion of administrative efficiency and educational planning are the impact of artificial intelligence on the implementation of economic programmes in secondary schools in Nigeria. The study also revealed that lack of infrastructure, limited access to advanced technology, resistance to change, language barrier, cost of implementation, lack of trained personnel and ethical considerations are the problems of deploying Artificial Intelligence for the implementation of Economics Programmes in Secondary Schools in Nigeria.

Conclusion

The paper evaluates the impact of artificial intelligence on the implementation of Economics programme in secondary schools in Nasarawa State, Nigeria. The study concluded that enhancement of teaching and learning through personalized instruction, improvement in curriculum delivery and resource accessibility, support for data-driven decision making in teaching and assessment, and promotion of administrative efficiency and educational planning are the impact of artificial intelligence on the implementation of Economics programme in secondary schools in Nasarawa State. Artificial Intelligence significantly enhances the implementation of Economics programme in secondary schools by enabling personalized learning, improving curriculum delivery, supporting data-driven teaching, and strengthening administrative efficiency. The study also revealed that inadequate infrastructure, limited access to advanced technology, resistance to change, language barrier, cost of implementation, inadequate trained personnel and ethical considerations are the problems of deploying Artificial Intelligence for the implementation of Economics programme in secondary schools in Nasarawa State.

Suggestions

Based on the findings, the following suggestions were made:

The Nasarawa State Ministry of Education should incorporate AI concepts and tools into the secondary school curriculum, particularly in Economics Education. This will help both teachers and students understand how AI can be applied to economic analysis, data interpretation, and problem-solving. Curriculum reform should also include digital literacy components to prepare students for an AI-driven economy.

Continuous professional development programmes should be organized by Nasarawa State Ministry of Education to train Economics teachers on the use of AI tools and digital technologies in classroom instruction. Teachers need to be equipped with practical skills to use intelligent tutoring systems, online learning platforms, and data analytics software for teaching economic concepts effectively. Partnerships with universities, teacher training institutes, and technology companies can support these initiatives.

Government should invest in improving ICT infrastructure in secondary schools to support AI adoption. This includes providing reliable electricity, internet connectivity, computers, and digital learning tools. Without adequate infrastructure, the potential benefits of AI in implementing Economics programme cannot be fully realized, especially in rural and underfunded schools.

The government should collaborate with private technology firms, non-governmental organizations, and international development partners to fund and implement AI-based educational projects. Such partnerships can help provide resources, technical expertise, and mentorship programmes that promote the use of AI in Economics teaching and learning.

There should be a robust system for monitoring and evaluating the integration of AI in Economics education to ensure its effectiveness and sustainability. Educational agencies should track how AI tools influence teaching quality, student performance, and curriculum implementation, using data to guide future improvements and policy decisions.

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