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International Journal of Educational Management, Rivers State University.

School Administration and Artificial Intelligence Towards Community Sustainable Development in Nigeria

[1]Nnamdi Edu PhD & [2]Uwelegbewe Patience Ebere PhD

[1]Department of Educational Management, Rivers State University, Nigeria.

[2]Department of Adult Education and Community Development, Rivers State University, Nigeria

Corresponding Authors' Email: bright.nna2@gmail.com

Abstract

An emerging trend that has great promise to improve the efficacy and sustainability of educational systems is the incorporation of artificial intelligence (AI) into school management. The use of AI in school administration and its effects on sustainable community development are examined in this paper. It makes the case that artificial intelligence (AI) may enhance decision-making, expedite administrative procedures, and establish customized learning environments—all of which support the more general objective of sustainable community development. AI allows educators and administrators to focus on more meaningful activities like strategy planning and community involvement by automating repetitive chores like scheduling, resource management, and data analysis. Furthermore, by promoting energy efficiency, cutting waste, and enabling more intelligent resource allocation, AI-driven solutions can assist sustainable educational practices.

Keywords: School Administration, Artificial Intelligence, Community Sustainable Development

Introduction

Education is the foundation for community sustainable development, which is essential for solving problems in the society. Sustainability requires a holistic approach that incorporates the interrelated dynamics of social, economic, and environmental systems (UNESCO, 2021). Therefore, it is the duty of educators and educational leaders to successfully prepare students to navigate and address future difficulties. These preparations should concentrate on improving quality in important areas such as environmental stewardship, social justice, equality, peacebuilding, and health education. according to UNICEF (2019) and Sterling (2020), an integrative approach like this guarantees that education plays a major role in creating a sustainable future.

Avurakoghene and Oredein (2023) emphasize that the development of individuals is a crucial aspect of educational leadership, with technology playing a pivotal role in facilitating this goal. Technology significantly enhances the quality of education across all levels of society,

contributing to improved learning outcomes and administrative efficiency. Akinoso (2018) highlights that contemporary society is increasingly dominated by the use of technology, defined as the application of scientific knowledge to address practical problems in human environments. Similarly, Bawa and Moyijo (2015) describe technology as a systematic and integrated process that involves identifying, analysing, and solving problems through the implementation, management, control, and evaluation of solutions.

Indeed, as technology advances, there is increasing interest in using AI in educational settings. AI technologies have the potential to transform various facets of education, including administrative functions, teaching methods, and leadership practices. AI tools can support personalized learning experiences, assist in identifying students' needs, and enable more efficient use of educational resources. Furthermore, when integrated into educational leadership, AI could enhance decision-making processes, optimize school management practices, and improve communication within school systems (Luckin, Holmes, Griffiths, & Forcier, 2019). This technological integration can lead to improved learning outcomes by providing data-driven insights and creating adaptive learning environments tailored to individual student needs (Chen, Zou, Cheng, & Xie, 2021).

Artificial intelligence has the capacity to carry out activities that have historically required human intelligence; it is a rapidly developing technology that has the potential to completely transform global sustainability initiatives. AI is essential to educational leadership because it makes administrative tasks like scheduling, record-keeping, grading, and decision-making much more efficient. Furthermore, by pinpointing areas for development and providing tailored assistance to teachers and students, AI enhances teaching and learning and can eventually help long-term community growth (Holmes, Bialik & Fadel 2021; Luckin, Holmes & Griffiths & Forcier 2018). The purpose of this paper is to investigate how AI can be successfully incorporated into educational leadership to support sustainable community development and this study seeks to add to the expanding body of research in this area.

Conceptual clarification

Concept of School Administration

School administration plays a major role in the successful running of educational institutions. as it encompasses procedures used in managing educational organizations such as schools, colleges, and universities towards actualizing stated goals and objectives. According to

Akram, Shah, & Rauf, (2018) educational leadership is a critical factor in determining the success of educational institutions. A shared objective can be achieved by staff members who are inspired and motivated by effective educational leaders

The term "school administration" refers to the methodical management of educational establishments, which includes organizing, directing, and controlling school operations in order to successfully meet learning objectives. It includes a variety of duties, including as creating curricula, managing personnel, allocating resources, and establishing school rules that promote a positive learning environment. Since school administrators operate as a liaison between educational demands and classroom implementation, they play a crucial role in developing educational policies and procedures. In addition to guaranteeing adherence to regional, state, and federal laws, efficient school management fosters creative approaches that address the many requirements of the community and children (Maqbool, Mahmood, & Iqbal 2022).

Additionally, school administration is essential in encouraging cooperation amongst community members, parents, and teachers, among other stakeholders. School administrators can develop rules that address the particular difficulties the school faces while reflecting community values and expectations by include these groups in the decision-making process. In the end, this cooperative approach improves student learning outcomes and fosters fairness within the educational system by ensuring that instructional techniques are effective and relevant (Savage, 2024). The responsibility of school administration in creating flexible and responsive policies to address the needs of all students is becoming more and more important as educational environments continue to change.

Concept of Artificial intelligence

The term artificial intelligence (AI) describes how computer systems may mimic human intellectual functions such as perception, language comprehension, learning, reasoning, and problem-solving. Artificial intelligence (AI) technologies use data analysis and algorithms to carry out activities that normally need human intellect. Applications of artificial intelligence (AI) in education include automated grading, tailored learning platforms, intelligent tutoring systems, and predictive analytics for student performance. AI can improve educational experiences and results by utilizing machine learning and data-driven insights, enabling teachers to customize their methods to meet the needs of each unique student (Ertel,2024).

Since AI is revolutionizing conventional teaching strategies and administrative procedures, its significance in contemporary education is substantial. AI-powered solutions are able to analyse enormous volumes of data in order to spot trends in learning, evaluate students' progress, and give immediate feedback. By implementing tailored learning experiences that accommodate a range of learning styles and speeds, instructors can enhance student engagement and academic performance (Davenport, Brynjolfsson, McAfee & Wilson, 2019). AI can also expedite administrative work, giving teachers more time to concentrate on instruction and developing deep connections with their kids. The use of artificial intelligence (AI) holds great promise for addressing present issues and transforming teaching and learning methodologies as educational establishments continue adopt technology.

SUSTAINABLE COMMUNITY DEVELOPMENT

One of the main global goals is sustainable development, which focuses on addressing current demands without sacrificing the capacity of future generations to address their own. As the cornerstone of social inclusion, economic prosperity, and environmental preservation, communities are essential to attaining sustainable development. By encouraging education, diversity, and resource exchange, communities can match local customs with international sustainability goals. Community members actively participate in planning and decision-making processes through the participatory approach, which guarantees the effectiveness and equity of development projects. For example, localized solutions can solve global concerns through grassroots innovations in waste management and the adoption of renewable energy (Zaman, Ahsan, & Rahman, 2021).

Communities have a role in sustainable development that goes beyond building resilience to environmental and socioeconomic shocks. Microfinance programs are one example of a community-based effort that lowers poverty and encourages economic empowerment. The networks and connections that exist inside communities, or social capital, further improve the ability of the group to mobilize resources and solve problems. The Sustainable Development Goals (SDGs) of the UN, especially Goal 11, which promotes sustainable cities and communities, are in line with these activities. According to studies, more sustainable and habitable settings result from community people being involved in urban planning (Kovacic, Strand, & Völker 2020). This emphasizes how important community involvement is to the creation and application of policies.

Furthermore, ongoing investments in infrastructure, education, and capacity-building are necessary for communities to flourish sustainably. People who participate in educational programs that emphasize sustainable practices and environmental stewardship have the information necessary to make wise judgments regarding their environment. In a similar vein, technological and infrastructure advancements like water conservation systems and smart grids improve sustainability locally. To provide the required funding and policy support for these efforts, governments, businesses, and non-governmental groups must work together. Communities can become the cornerstones of sustainable development through a collaborative strategy that involves all stakeholders (Smith & Stirling, 2018).

ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE COMMUNITY DEVELOPMENT

Artificial Intelligence (AI) is transforming sustainable community development by providing cutting-edge instruments and solutions that improve governance, community well-being, and resource efficiency. Data-driven decision-making is made possible by AI-powered systems, which help communities solve pressing issues like poverty, education, and environmental degradation while making the most use of scarce resources. To reduce energy waste and encourage the use of renewable energy sources, smart grids can be implemented thanks to AI's ability to analyse big datasets and find patterns in energy usage (Li, Zhang, & Zhao, 2022). These uses highlight AI's capacity to match regional development strategies with international sustainability objectives.

One of the significant contributions of AI is its ability to improve urban planning and infrastructure management. AI-powered tools like predictive modelling and geospatial analysis assist in designing smart cities that are resilient to environmental and social challenges. For example, AI can simulate the impact of climate change on urban areas, helping planners create adaptive infrastructure. Furthermore, real-time AI-driven monitoring systems improve waste management, traffic flow, and disaster preparedness, ensuring safer and more sustainable communities (Singh, Kumar, & Jain, 2021).). These advancements are crucial for achieving Sustainable Development Goal (SDG) 11, which emphasizes sustainable cities and communities.

Artificial intelligence also promotes empowerment and inclusivity by resolving inequalities in access to financial, medical, and educational services. In order to close educational gaps and

improve human capital, AI-driven e-learning platforms offer individualized instruction to marginalized communities. Artificial intelligence (AI) applications in telemedicine also improve community health outcomes by bringing healthcare services to remote locations. According to Rahman, Kabir., & Alam (2023) Artificial intelligence helps small-scale farmers in agriculture by enabling precision farming systems that maximize crop yields while reducing their negative effects on the environment. AI plays a major role in building just and sustainable communities by lowering disparities and enhancing access to necessary services.

Even if AI has the potential to revolutionize community development, there are practical and ethical issues that must be resolved. Policies that guarantee the ethical use of AI are necessary, as evidenced by worries about algorithmic bias, data privacy, and the digital divide. Furthermore, promoting local ownership of AI-driven projects requires enhancing community AI capabilities through training and education. Governments, businesses, and non-governmental groups must work together to optimize AI's advantages while reducing its threats (Zhang & Wang, 2023). With careful application, artificial intelligence (AI) can be a potent accelerator for attaining sustainable development in local communities across the globe.

SCHOOL ADMINISTRATION AND ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE COMMUNITY DEVELOPMENT

School administration is changing as a result of artificial intelligence (AI), which allows organizations to maximize their productivity and support long-term community growth. AI gives administrators more time to concentrate on strategic planning and student-centred activities by automating time-consuming administrative duties like scheduling, attendance tracking, and data analysis. By ensuring that resources are distributed efficiently, this operational efficiency reduces waste and promotes sustainability. AI systems, for example, can forecast resource requirements by analysing enrolment data, guaranteeing fair distribution and lowering the possibility of over- or under-utilization (Zhang & Liu, 2021).

AI also enhances educational resource management, which is critical for promoting environmental sustainability within schools. AI-powered energy management systems optimize electricity usage, reducing carbon footprints and operational costs. Digital learning platforms, supported by AI, reduce reliance on paper-based resources, promoting eco-friendly practices. Furthermore, virtual laboratories and simulations enable students to engage in experiential learning without the need for extensive physical materials, aligning with Development Goal (SDG) 12, which emphasizes responsible consumption and production (Li, Zhang, & Zhao,

2022). These technological advancements position schools as leaders in sustainable practices within their communities.

Sustainable development necessitates community engagement, and AI helps schools forge closer bonds with the community. Schools can continue to communicate with parents, local government representatives, and community organizations in a transparent and consistent manner thanks to AI-driven platforms. Schools can use predictive analytics to pinpoint community needs, like environmental campaigns or literacy initiatives, and work with stakeholders to successfully solve these issues. Additionally, schools can serve as centers for sustainability education thanks to AI, which encourages community members to take awareness and action together (Rahman, Kabir, & Alam, 2023).

AI integration in education also fosters inclusion, which is critical for long-term community growth. Intelligent tutoring programs offer individualized instruction to meet the various requirements of pupils, especially those from underrepresented groups or with disabilities. AI-driven language translation technologies promote fair educational opportunities by guaranteeing accessibility for students in multilingual environments. Furthermore, by identifying and assisting at-risk children, predictive analytics help school's lower dropout rates and enhance overall academic results. Such initiatives promote long-term sustainability and fortify communities' social cohesion (Singh & Gupta, 2022).

Challenges Encountered by School Administrators in Leveraging Artificial Intelligence for Sustainable Community Development in Nigeria.

There are many obstacles in Nigeria when it comes to implementing artificial intelligence (AI) in school administration to promote sustainable community development. The major problems are the absence of proper infrastructure, which includes erratic power supplies and spotty internet access, inadequate funding, lack of technical expertise, data privacy and ethical concerns and digital divide.

Erratic Power supply and spotty internet

When school administrators in Nigeria try to use artificial intelligence (AI) to support sustainable community development, they face major obstacles due to unstable internet connection and an unpredictable power supply. These infrastructure constraints make it more difficult to integrate AI technology, which need reliable electricity and fast internet to work at their best. This could make it harder for schools to adopt AI-powered teaching resources, data

analysis programs, and other AI applications that could help with community development projects. It is more difficult for educational institutions in underprivileged areas to fully utilize AI in promoting socioeconomic development because of the uneven supply of resources, which further widens the digital divide (Adamu & Mohammed, 2023; Okoye, Nwachukwu, & Chukwuma 2022).

Effective implementation of AI-based systems is challenging in many schools, particularly those in rural areas, which have limited technology infrastructure. The deployment and operation of AI tools for administrative and educational purposes are hampered in the absence of reliable energy and internet connection, leading to discrepancies in the adoption of AI technology (Adepoju & Salawu, 2021).

Inadequate funding

Inadequate funding for educational technology efforts is another problem. Due to financial limitations, many Nigerian schools give priority to necessities above new technology. The significant hardware, software, and training costs associated with implementing AI are frequently out of the price range of underfunded public institutions. Additionally, the lack of government funding for educational technology makes this problem even worse by depriving school administrators of the tools they need to successfully incorporate AI into their systems (Okafor, Olatunji, & Adeyemi, 2022).

Lack of Technical expertise

One major obstacle is the lack of technical skills among educators and school administrators. Many educators in Nigeria lack the abilities and know-how to implement and use AI solutions. The lack of thorough training programs designed to give educators the competences required for integrating AI further widens this skills gap. Because of this, administrators are unable to fully utilize AI's potential to improve school administration and promote community development (Adebayo & Adedoyin, 2023).

Data privacy and Ethical Concerns

Concerns about ethics and data privacy are also major barriers. Sensitive data about students, instructors, and communities is frequently gathered and processed when AI systems are used. Nigeria does not, however, have strong data protection laws to prevent abuse or security breaches. This deters schools from implementing AI technologies by bringing up ethical questions around the possible misuse of personal data. For Nigerian schools, maintaining

adherence to international data privacy requirements continues to be a major concern (Eze, Akinola, & Uche, 2021).

Digital Divide

Finally, the equitable use of AI for sustainable community development is further constrained by the digital divide between urban and rural schools. Rural schools frequently lack even the most basic digital resources, whereas urban schools could have access to basic technical infrastructure. This discrepancy erodes AI's potential to support sustainable development on a national level by maintaining disparities in community involvement and educational quality (Lythreatis, SSingh, & El-Kassar, 2022).

Conclusions

In conclusion, integrating artificial intelligence (AI) into school administration offers a promising way to promote sustainable community development in Nigeria. AI can improve educational management by simplifying administrative tasks, enhancing decision-making, and creating individualized learning environments for students. By integrating AI into school operations, administrators can monitor student progress, allocate resources optimally, and implement data-driven strategies that cater to the specific needs of their communities. This technological shift could result in more effective and efficient educational systems, which would ultimately benefit society as a whole.

However, resolving the issues of insufficient infrastructure, a lack of technological know-how, and resource accessibility is necessary for the effective use of AI in schools. Poor internet connectivity and erratic electricity supplies remain major challenges, particularly in rural areas. It is imperative that the public and commercial sectors work together to improve infrastructure, offer reasonably priced AI tools, and provide thorough training programs for educators and school administrators in order to get over these obstacles. The entire potential of AI in education can only be achieved with these coordinated efforts.

As long as local ideas, frameworks, and policies support the country's development objectives, artificial intelligence in Nigerian schools has a bright future. By solving local issues, encouraging sustainable behaviours in communities, and giving students the skills they will need for the workforce of the future, the efficient application of AI can spark greater societal change. Nigerian school administrators must continue to be flexible as AI technology develops, making sure that its uses are ethical, inclusive, and pertinent to the nation's socioeconomic

situation. AI has the potential to be a potent instrument in creating a sustainable and successful future for everybody in this way.

Suggestions

The following tactics can be put into practice to help school administrators in Nigeria overcome the obstacles they face when utilizing artificial intelligence (AI) for sustainable community development:

1. **Improved Infrastructure Investment**: Investments in dependable power and internet infrastructure should be given top priority by the Nigerian government and educational establishments. This can entail establishing solar-powered systems in isolated locations and forming alliances with telecom providers to guarantee that schools have access to fast internet.
2. **Adequate funding:** The education sector should receive adequate funding from the government to improve the usage of AI in the classroom.
3. **Capacity Building and Training**: Regular training on AI technologies and their applications should be provided to educators, students, and school officials. This will improve their technical proficiency and enable them to successfully incorporate AI tools into community development and school administration initiatives.
4. **Policy and Regulatory Frameworks**: Creating national rules that encourage the use of AI in education can give administrators and schools a clear path forward. To guarantee that AI is applied in a way that benefits all communities, these regulations should cover topics like data protection, AI ethics, and fair access to technology. The government of Nigeria should enact laws to protect artificial intelligence usage in Nigeria.
5. To end digital divide and guarantee that all schools, wherever they may be, may take advantage of AI advancements, certain regulations and funding are needed.

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