

ARTIFICIAL INTELLIGENCE: A DEPENDABLE TOOL FOR EFFECTIVE MANAGEMENT OF RESOURCES IN SECONDARY SCHOOLS

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ABSTRACT

The study examined artificial intelligence as a dependable tool for effective management of resources in secondary schools in Akwa Ibom State. The management of resources in secondary schools is a crucial aspect of ensuring quality education, efficient administration, and optimal student performance. In the context to carry out this research, numerous subheads were taken into consideration, some of which included: concept of artificial intelligence, concept of resources management and types of resources in secondary schools. Furthermore, the study mentioned the types of resources in secondary schools to include human resources, physical resources, and financial resources. It also mentioned the roles of artificial intelligence in effective management of resources in secondary schools to include human resource management in schools, financial/budget management, and scheduling and timetable optimisation. The challenges of artificial intelligence in the effective management of resources in secondary school, as mentioned in the study, included infrastructural limitations, financial constraints, and lack of teacher training/expertise. Furthermore, the study mentioned the mitigating strategies to the challenges of artificial intelligence in effective management of resources in secondary school to include enhancing technological infrastructure, securing financial investment, and building technical expertise. The study concluded that artificial intelligence is a reliable and innovative tool for improving resource management in secondary schools in Akwa Ibom State. One of the recommendations made was that the Akwa Ibom State Ministry of Education should implement AI-driven resource management systems to optimise the allocation and utilisation of educational materials, infrastructure, and personnel in secondary schools.

Keywords: **Artificial Intelligence, Dependable Tool, Effective Management, Resources, Secondary Schools, and Akwa Ibom State**

Introduction

The management of resources in secondary schools is a crucial aspect of ensuring quality education, efficient administration, and optimal student performance. As schools expand and

the demand for quality education increases, administrators are faced with the challenge of effectively utilising available resources to meet the needs of students, teachers, and other stakeholders. In recent years, artificial intelligence (AI) has emerged as a transformative tool in various sectors, including education. AI-driven solutions have the potential to enhance the efficiency of resource management in secondary schools, particularly in Akwa Ibom State, where the education sector is continuously evolving to meet the demands of the 21st century.

Artificial intelligence encompasses a wide range of technologies, including machine learning, data analytics, and automation, which can significantly impact decision-making processes in educational institutions. AI can assist school administrators in optimising the allocation of financial resources, improving staff management, enhancing student performance tracking, and ensuring effective use of infrastructure (Selwyn, 2019). By leveraging AI, secondary schools can streamline administrative tasks, reduce operational costs, and create a more conducive learning environment for students and teachers alike.

One of the critical challenges faced by secondary schools in Akwa Ibom State is the inefficiency in managing human and material resources. Traditional methods of school administration often rely on manual processes that are prone to errors and inefficiencies (Ololube, 2013). AI offers automated solutions for scheduling, record-keeping, and performance assessment, thereby reducing the workload on school administrators and enabling them to focus on more strategic decision-making processes.

Moreover, AI-powered data analytics can provide valuable insights into student performance trends, helping educators identify learning gaps and tailor instructional strategies accordingly. AI-driven systems can also assist in predicting student dropouts and recommending interventions to improve retention rates (Woolf, 2020). In a region like Akwa Ibom State, where disparities in educational access and quality exist, AI can play a pivotal role in promoting inclusive education and ensuring that all students receive adequate support.

The financial management of secondary schools is another area where AI can make a significant impact. Budgeting and expenditure tracking can be optimised using AI algorithms that analyse past spending patterns and predict future financial needs. This ensures that resources are allocated judiciously, minimising wastage and ensuring financial sustainability in schools (Baker & Richards, 2021).

Concept of Artificial Intelligence (AI)

Artificial intelligence is the study of how the human brain makes decisions, learns new things, and thinks through difficulties. According to Lion and Ekefre (2024), the term artificial intelligence (AI) describes computer programs that are able to carry out sophisticated operations that were previously limited to human performance, such as problem-solving, thinking, and decision-making. Artificial intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. Artificial intelligence (AI) describes computer programs that are able to carry out sophisticated operations that were previously limited to human performance, such as problem-solving, thinking, and decision-making (Ufot, 2024).

Furthermore, Bassey and Owushi (2023) defined artificial intelligence as the collection of technologies that enable machines to sense, comprehend, act, and perform several functions matching those of humans. The goal of artificial intelligence is to enhance computer abilities related to human understanding, including language intelligence, learning, reasoning, and problem-solving (Akpan and Clark, 2024). Furthermore, Huge and Godwin (2024) defined artificial intelligence (AI) as the idea and practice of creating computer systems that can do

tasks like speech recognition, decision-making, and pattern recognition that traditionally needed human intelligence.

Furthermore, Ikechukwu (2024) mentioned that in contrast to the inherent intelligence of biological things, artificial intelligence (AI) is the broad definition of intelligence displayed by machines, especially computer systems. By utilising clever algorithms integrated into a dynamic computing environment, artificial intelligence mimics human thought processes. A branch of computer science called artificial intelligence studies how computers learn, comprehend data, recognize characters in images, analyse pictures, and simulate how the eyes work. In addition, artificial intelligence refers to the research and programming of computers to carry out intelligence tasks that require human intervention (Udo-Okon and Akpan, 2024).

In the same vein, Bassey and Owushi (2023) defined artificial intelligence as the collection of technologies that enable machines to sense, comprehend, act, and perform several functions matching those of humans. Major components of the artificial intelligence bucket are machine learning, big data, natural language processing, decision logic, data visualization, and data analytics.

Concept of Resource Management

Resource management involves the strategic planning, allocation, and utilization of an organization's assets such as human capital, finances, technology, and natural resources to achieve objectives efficiently and sustainably. Effective resource management ensures that resources are used optimally, waste is minimized, and organizational goals are met.

In the context of human resources, management encompasses functions like recruitment, job analysis, job evaluation, remuneration, and organizational development. These elements are crucial for enhancing employee performance and preventing industrial conflicts. Osewa & Osewa, (2020). Human Resource Manager is that person saddled with the responsibilities of managing every activity revolving round the human and the activities of those human in an organization. This person must be inventive and innovative in nature, and must be competent in terms of managing conflict and grievances among workers. Such manager must be able to detect workers with bad mood and intra-conflict, and be able to deal with such issues, so that it does not affect performance of such worker and productivity, hence increase profit. Human resources manager is the person responsible for the recruitment, training and development of staff, administering salaries, pensions and benefits; and looks after the health, safety and welfare of all employees

Urban resource management focuses on the sustainable use of resources within city environments. Resource Management (RM) is a key factor for Sustainable Development (SD), which in turn must guide Urban Planning (UP). Zucaro, (2022) emphasize the need for strategic resource management to move towards sustainable cities. They advocate for monitoring and managing urban resources and energy systems, defining innovative approaches for non-renewable resource management, protecting urban ecosystem services, and engaging in participatory governance for resource allocation.

Types of Resources in Secondary Schools

Resources in secondary schools are crucial for facilitating effective teaching and learning. These resources can be broadly categorized into human resources, physical resources, financial

resources, technological resources, and instructional resources. The availability and proper utilization of these resources significantly impact students' academic performance and overall school development.

Human Resources

Human resources include teachers, administrators, and support staff who facilitate the learning process. Teachers are the most critical human resource, as they directly influence students' understanding and motivation. According to Mohzana, (2025), well-trained and motivated teachers enhance student performance by implementing effective pedagogical strategies. Their study found that schools with higher teacher-to-student ratios and continuous professional development programs had better academic outcomes. Additionally, non-teaching staff such as counselors, librarians, and school administrators play a crucial role in providing a supportive learning environment. The competency and efficiency of these human resources determine the overall success of secondary schools. To improve quality education, investment in teacher training, recruitment, and motivation is essential

Physical Resources

Physical resources refer to the tangible facilities and infrastructure available in schools, including classrooms, libraries, laboratories, playgrounds, and sanitation facilities. A well-equipped school fosters a conducive learning environment and improves student engagement. A study by Hassan, (2025) in Nigerian secondary schools highlighted that properly maintained school buildings, science labs, and stocked libraries significantly contribute to student performance. Schools with inadequate infrastructure struggle with overcrowding, poor sanitation, and a lack of proper teaching aids, leading to poor academic outcomes. Access to playgrounds and sports facilities also enhances student well-being and extracurricular participation, which contribute to holistic education. Schools must prioritize infrastructure investment to provide students with safe and effective learning environments.

Financial Resources

Financial resources are critical in ensuring the smooth operation of secondary schools. Funding is required for teacher salaries, school maintenance, purchasing learning materials, and developing new educational programs. Research by Jarnig, (2025) found that secondary schools with higher budget allocations perform better than underfunded institutions, as they can afford modern teaching tools and well-trained teachers. Many public schools, especially in developing countries, face financial constraints, leading to inadequate learning materials and poorly maintained infrastructure. Governments and educational stakeholders must ensure equitable funding distribution to bridge the gap between well-funded and underfunded schools. Alternative funding strategies such as public-private partnerships (PPPs), grants, and alumni contributions can also enhance financial sustainability.

Technological Resources

Technological resources in secondary schools include computers, projectors, smart boards, educational software, and internet access. The integration of technology into education has transformed traditional teaching methods, making learning more interactive and efficient. Schools with high digital accessibility showed increased student engagement and better academic outcomes. Digital learning tools allow students to access a wealth of information

online, conduct research, and participate in virtual learning environments. However, the digital divide remains a challenge, as students in rural and underprivileged areas lack access to technological resources. To bridge this gap, policymakers must ensure affordable internet access and the provision of digital devices to all students, regardless of their socio-economic background.

Instructional Resources

Instructional resources refer to textbooks, laboratory equipment, teaching aids, online courses, and other learning materials that help deliver effective instruction. Well-structured instructional materials significantly improve students' understanding and retention of concepts. The study found that the use of multimedia tools, digital libraries, and interactive content made learning more engaging and accessible. However, many schools, especially in developing nations, lack sufficient textbooks and laboratory equipment, leading to a disparity in learning quality. The integration of electronic media in classrooms has been shown to enhance science education and increase students' curiosity about complex subjects. Governments and school administrations must ensure that all students have access to high-quality instructional resources to promote academic excellence.

Roles of Artificial Intelligence in Effective Management of Resources in Secondary Schools

The following are the roles of artificial intelligence in effective management of resources in secondary schools:

Human Resource Management in Schools: Effective human resource management in secondary schools is crucial for maintaining a productive learning environment. AI tools help automate tasks such as teacher recruitment, performance evaluations, and professional development programs. According to Niedbał, (2024), AI-driven human resource management systems can analyze large datasets of employee performance, suggest personalized training programs, and enhance overall staff well-being.

Financial and Budget Management: AI helps school administrators optimize budget allocation by analyzing historical financial data and predicting future expenditures. AI models can forecast budget needs based on student enrollment, infrastructure development, and operational expenses. AI can eliminate resource wastage and enhance financial management in educational institutions by providing real-time insights into expenditure patterns.

Scheduling and Timetable Optimization: Traditional scheduling methods often lead to inefficiencies in classroom and teacher allocations. AI-driven scheduling systems ensure that classrooms and teachers are assigned optimally, reducing conflicts and improving efficiency. Sarwar and Saima (2024) emphasize that AI can enhance time management in secondary schools by creating intelligent timetables that adjust dynamically to changes in teacher availability and student needs.

Learning Resource Management: AI is revolutionizing the way learning materials are distributed and utilized in secondary schools. Digital learning platforms powered by AI can suggest personalized learning resources to students based on their strengths and weaknesses. AI-based learning resource management systems enable schools to track textbook usage, predict future resource needs, and prevent shortages.

Student Performance Monitoring and Predictive Analytics: AI-powered analytics systems can track student performance and provide early warnings about potential academic struggles. These systems use data from tests, attendance records, and behavioral patterns to suggest interventions. Alhakbani (2024) highlights how AI-powered monitoring tools improve decision-making for teachers and administrators by offering real-time insights into student engagement and learning outcomes.

Energy and Infrastructure Management: AI plays a significant role in managing school infrastructure by optimizing energy consumption and maintaining facilities. AI-powered smart grids and predictive maintenance systems reduce operational costs and improve sustainability. Purbiyanti, (2024) discuss how AI-driven systems in secondary schools monitor energy usage and suggest conservation strategies.

The Challenges of Artificial Intelligence in Effective Management of Resources in Secondary School

The integration of Artificial Intelligence (AI) in secondary education holds significant promise for enhancing resource management, instructional delivery, and administrative efficiency. However, several challenges impede its effective implementation.

Infrastructural Limitations: A primary obstacle is the inadequate technological infrastructure in many secondary schools. Issues such as limited access to computers, unreliable internet connectivity, and inconsistent power supply hinder the deployment of AI tools. For instance, a study focusing on Nigerian secondary schools highlighted that infrastructural constraints significantly impede the adoption of AI in science education, thereby affecting the quality of teaching and learning. As quoted by Zavodna, (2024) infrastructure limitations, including inadequate computing resources, outdated systems, or insufficient technical support, pose a challenge to artificial intelligence in effective management of resources.

Financial Constraints: The high costs associated with AI technology present another significant barrier. Many educational institutions struggle with limited budgets, making it challenging to invest in necessary AI tools and platforms. Research indicates that inadequate funding is a major hurdle in integrating AI-based technology in education. A major challenge to effectively managing resources with Artificial Intelligence are high implementation costs, limited technical expertise, and concerns over data privacy can hinder the integration of AI tools. Hidayat, (2024) the application of AI is not most effectively restricted to using algorithms and predictive models; on the contrary, this generation is developing a major transformation within the financial decision-making process.

Lack of Teacher Training and Expertise: Effective AI integration requires educators to possess a certain level of technical proficiency. However, many teachers lack adequate training in AI applications, leading to resistance or ineffective use of these technologies. A study examining the role of AI in Nigerian secondary schools emphasized the need for comprehensive teacher training programs to enhance educators' competence in utilizing AI tools (Almethen, 2024).

Ethical and Privacy Concerns: The deployment of AI in education raises ethical issues, particularly regarding data privacy and algorithmic bias. Collecting and analyzing student data through AI systems necessitates stringent measures to protect privacy and ensure data security.

(Eden et al., 2024) stated that there is a risk of AI systems perpetuating existing biases present in their training data, which could lead to unfair outcomes. Addressing these concerns requires the development of robust ethical guidelines and policies.

Resistance to Change: Introducing AI into traditional educational settings often encounters resistance from educators and administrators accustomed to conventional teaching methods. This reluctance can stem from a lack of understanding of AI's benefits or fear of technology replacing human roles. A teacher-centric study on AI implementation in Saudi Arabian secondary schools found that resistance to change from colleagues was a significant factor contributing to the challenges faced.

Compatibility with Existing Curricula: Grassini (2023) quoted that Aligning AI applications with current curricula poses another challenge. Ensuring that AI tools complement and enhance the existing educational framework without causing disruptions requires careful planning and collaboration among stakeholders. A study on AI integration in Nigerian secondary schools recommended strategic curriculum development to foster a blended learning environment that effectively incorporates AI tools.

Equity and Access Issues: There's a risk that AI integration could exacerbate existing educational inequalities. Students in under-resourced schools or regions may have limited access to AI tools, leading to a widening gap in educational opportunities. Addressing this issue requires targeted policies and investments to ensure equitable access to AI resources across diverse educational settings (Zavodna, 2024).

The Mitigating Strategies to the challenges of Artificial Intelligence in Effective Management of Resources in Secondary School

Integrating Artificial Intelligence (AI) into secondary education offers significant opportunities to enhance resource management, instructional delivery, and administrative efficiency. However, effective implementation requires addressing several challenges through strategic mitigation approaches. By implementing these strategies, secondary schools can effectively navigate the challenges associated with AI integration, leading to improved resource management and educational outcomes.

Enhancing Technological Infrastructure: A robust technological foundation is essential for AI integration. Schools should invest in reliable internet connectivity, adequate hardware, and sustainable power solutions. Collaborations with governmental bodies and private sector partners can facilitate access to necessary resources and funding. For instance, the U.S. Department of Education emphasizes the importance of infrastructure in leveraging AI for educational advancements.

Securing Financial Investments: Addressing financial constraints is crucial. Schools can explore grants, public-private partnerships, and government funding dedicated to educational technology initiatives. Allocating budgets specifically for AI tools and professional development ensures sustained implementation. A comprehensive study highlights the need for strategic financial planning to support AI integration in educational management systems.

Building Technical Expertise: Developing technical proficiency among educators and administrators is vital. Regular professional development programs focusing on AI applications in education can empower staff to effectively utilize these tools. Institutions might also consider hiring or consulting with IT professionals specializing in educational technologies. Research indicates that technical expertise is a significant factor in the successful adoption of AI in schools (Owoc, 2021).

Fostering a Culture Open to Change: Tambuskar, (2022) Resistance to change can impede AI adoption. Creating an organizational culture that embraces innovation involves transparent communication about the benefits of AI, involving stakeholders in decision-making, and highlighting success stories. Engaging teachers, students, and parents in discussions about AI's role can facilitate smoother transitions. A study discusses the importance of addressing resistance to change for effective AI implementation in education.

Establishing Ethical and Privacy Standards: Implementing clear policies to protect student data and ensure ethical AI use is paramount. Developing guidelines that address data privacy, consent, and algorithmic transparency can build trust among stakeholders. The U.S. Department of Education's report on AI underscores the necessity of ethical considerations in educational AI applications (Eden, 2024).

Implementing Pilot Programs: According to Tambuskar, (2022). Pilot programs allows schools to assess AI tools' effectiveness and address challenges on a smaller scale before widespread implementation. This approach enables institutions to gather data, make informed decisions, and refine strategies for broader adoption. A comprehensive study recommends pilot testing as a prudent step toward successful AI integration in educational settings.

Encouraging Continuous Feedback and Improvement: Establishing mechanisms for ongoing feedback from educators, students, and parents can inform continuous improvement of AI initiatives. Regular assessments and openness to iterative changes ensure that AI tools remain effective and relevant to the school's needs. Research highlights the importance of feedback loops in refining AI applications in education (Zavodna, et al., 2024).

Conclusion

Artificial Intelligence is a reliable and innovative tool for improving resource management in secondary schools in Akwa Ibom State. By integrating AI into administrative, financial, and academic processes, schools can enhance efficiency, transparency, and decision-making. AI-driven analytics enable educators to track student progress, optimize resource allocation, and improve overall educational outcomes. Furthermore, AI enhances financial management by minimizing waste and ensuring sustainability. While challenges such as infrastructure limitations and skill gaps exist, strategic investment and policy support can facilitate AI adoption. Embracing AI in secondary schools is essential for fostering a more efficient and effective educational system in Akwa Ibom State.

Recommendations

1. The Akwa Ibom State Ministry of Education should implement AI-driven resource management systems to optimize the allocation and utilization of educational materials, infrastructure, and personnel in secondary schools.

2. Teachers, school administrators, and education stakeholders should receive comprehensive training on AI applications in resource management. This includes workshops, professional development programs, and hands-on experience with AI tools to enhance their ability to leverage technology for improved decision-making and school administration.
3. The government should collaborate with tech companies, universities, and non-governmental organizations to develop AI solutions tailored to secondary education needs in Akwa Ibom State. Such partnerships can facilitate the funding, deployment, and maintenance of AI-powered management systems while ensuring sustainability and continuous improvement.

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