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Integration of Artificial Intelligence (AI) into School Supervision in South-South Geopolitical Zone of Nigeria

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Abstract
This study examined the integration of Artificial Intelligence (AI) into school supervision in the South-South geopolitical zone of Nigeria. The objectives were to determine the extent of AI integration, identify its benefits, challenges, and to explore strategies for enhancing its effective utilization. The study adopted a survey design, using a sample of 642 respondents drawn from a population of 6,420 principals and vice-principals from public and private secondary schools in the study area. A structured questionnaire titled Artificial Intelligence Integration in School Supervision Questionnaire (AIISSQ), was used for data collection. Data were analyzed using descriptive statistics. Findings revealed that AI integration in school supervision remains at a low level, hindered by poor infrastructure, limited technical capacity, and inadequate funding. However, AI was found wanting in improving supervisory efficiency, data accuracy, and decision-making processes. The study concluded that AI has the potential to transform supervision in secondary schools if properly harnessed. It recommended enhanced training for supervisors, adequate funding, improved infrastructure, policy support, and collaboration with technology experts to ensure sustainable AI integration in educational supervision.
Keywords: Artificial Intelligence, school supervision, supervisory efficiency, decision-making, secondary education

Introduction
The supervision of secondary education in Nigeria, particularly in the South-South geopolitical zone, faces significant challenges that undermine its sustainability and quality outcomes. Traditional supervision practices are largely manual, time-consuming, and often ineffective in addressing emerging issues such as teacher absenteeism, poor instructional delivery, inadequate monitoring of students' progress, and limited feedback mechanisms. Supervisors and principals frequently encounter logistical constraints, insufficient data for decision-making, and inadequate professional development tools. Consequently, the capacity of the supervision system to promote accountability, quality assurance, and continuous improvement in teaching and learning remains weak. These systemic inefficiencies have contributed to declining educational standards, low students' performances, and unsustainable school management practices across the region.

In recent years, the global shift toward digital transformation and emerging technologies has emphasized the potential of Artificial Intelligence (AI) as a catalyst for innovation in educational supervision. AI-driven systems can automate supervision tasks, analyze real-time data on teacher and student performance, identify instructional gaps, and provide predictive insights for decision-making. However, in most secondary schools within the South-South zone, the integration of AI tools into supervision practices remains at a rudimentary level. Factors such as inadequate digital infrastructure, lack of technical know-how among school administrators, and limited policy frameworks for AI integration hinder effective adoption. This gap has prevented education stakeholders from harnessing AI's transformative potential to enhance supervisory efficiency, promote transparency, and foster sustainable educational development.

The failure to integrate AI into school supervision poses serious implications for the sustainability of secondary education in the region. Without adopting intelligent systems that can streamline supervisory processes, detect inefficiencies early, and support data-driven decision-making, the education sector risks stagnation in the face of rapidly evolving global standards. There is an urgent need to explore how AI can be systematically integrated into supervision practices to strengthen accountability, improve quality control, and ensure the continuous relevance of secondary education in South-South Nigeria. Therefore, this study seeks to investigate the integration of Artificial Intelligence into school supervision as a pathway to sustaining and improving the secondary education system in the region.

The integration of Artificial Intelligence (AI) into educational systems has become a major focus of global reform efforts aimed at improving efficiency, accountability, and sustainability in school administration and supervision. According to Adejoh and Uzoigwe (2023), AI serves as a catalyst for transforming traditional education management through data-driven insights that enable school leaders to make informed decisions. They argue that AI-based tools such as predictive analytics, automated reporting, and virtual monitoring systems can enhance the effectiveness of supervisory processes by providing timely information on teachers' instructional practices and students' learning progress. Similarly, Okon et al. (2025) emphasize that integrating AI into school supervision reduces administrative burdens on principals and inspectors, allowing them to focus more on instructional leadership rather than routine clerical tasks.

Supervision is a critical component of educational quality assurance, ensuring compliance with standards and continuous professional development among teachers. However, Inah et al. (2024) observed that conventional supervisory methods in Nigerian secondary schools are often manual, inconsistent, and limited in scope, thereby failing to achieve sustainable educational improvement. They highlighted that AI technologies, including intelligent scheduling systems and digital observation platforms, can strengthen monitoring efficiency and ensure equitable evaluation of teachers' performance. Paul et al. (2024) further assert that adopting AI in supervision could bridge communication gaps between school administrators and teachers, promote transparency in feedback mechanisms, and ensure that supervisory data are accurately recorded and analyzed for strategic planning.

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Globally, the application of AI in education has been shown to improve decision-making and optimize learning environments. Adams and Uzoigwe (2023) reported that in developed countries, AI has been successfully integrated into school supervision through intelligent dashboards, performance analytics, and automated reporting systems. These tools assist supervisors in identifying areas requiring intervention and tracking educational outcomes over time. However, the authors noted that many developing nations, including Nigeria, still lag in AI adoption due to inadequate infrastructure and limited digital literacy among educators. Mbon and Uzoigwe (2023) emphasized that the lack of investment in AI technologies in the education sector perpetuates inefficiency in school supervision and weakens the sustainability of educational reforms in the country.

Furthermore, the role of AI in promoting sustainable education cannot be overemphasized. Ayang et al. (2025) explained that sustainability in education involves maintaining consistent quality, accessibility, and adaptability of learning systems over time. AI facilitates sustainability by enabling predictive supervision, early detection of declining performance, and timely corrective interventions. In the same vein, Osim and Uzoigwe (2023) revealed that AI-driven supervision can support continuous teacher development by identifying specific areas where professional support is needed, thus improving instructional quality and long-term system resilience.

Despite the recognized benefits, several challenges hinder the integration of AI in school supervision across Nigeria's South-South geopolitical zone. Onya et al. (2023) identified key barriers such as poor funding, inadequate training of school administrators, and weak policy frameworks. They observed that many schools lack the digital tools and connectivity required to implement AI-based supervision effectively. Ekanem and Uzoigwe (2023) also stressed that resistance to technological change and limited awareness among educators further impede progress. They recommended structured training and policy reforms to promote digital literacy and capacity building among supervisors and teachers.

Empirical studies also indicate that AI integration in school supervision improves transparency and accountability in school management. Effiom et al. (2024) found that when supervisors employ AI tools to track teacher attendance, instructional delivery, and assessment records, the likelihood of administrative malpractice significantly decreases. Their findings demonstrate that data-based supervision enhances trust and ensures equitable evaluation among staff, fostering sustainable educational outcomes. Similarly, Ategwu et al. (2022) concluded that AI-enabled supervision systems strengthen collaboration among educational stakeholders and ensure continuous monitoring without geographical limitations, making supervision more efficient and inclusive.

In summary, the literature reveals a strong consensus on the potential of Artificial Intelligence to revolutionize school supervision and ensure the sustainability of secondary education in Nigeria. However, the gap between theoretical awareness and practical implementation remains wide in the South-South geopolitical zone. Most schools continue to rely on traditional supervisory models that fail to leverage digital technologies for effective oversight. Therefore, this study seeks to empirically investigate the extent of AI integration into school supervision, identify the challenges hindering its adoption, and propose strategies for enhancing the

sustainability of the secondary education system in the South-South geopolitical zone of Nigeria.

Statement of the problem

The supervision of secondary education in the South-South geopolitical zone of Nigeria has long been characterized by traditional, manual, and often ineffective monitoring systems that fail to address the dynamic needs of modern schooling. Supervisors and principals rely heavily on physical visits, handwritten reports, and subjective evaluations, which are time-consuming and prone to bias. These outdated methods hinder timely feedback, reduce accountability, and limit the use of real-time data in decision-making. Consequently, critical aspects of school performance - such as teacher effectiveness, instructional quality, and student learning outcomes - remain poorly monitored, leading to a gradual decline in educational standards and the sustainability of the secondary education system in the region.

Despite the growing recognition of Artificial Intelligence (AI) as a transformative tool for improving efficiency and accountability in education, its integration into school supervision practices in the South-South zone remains minimal. Many schools lack the digital infrastructure, trained personnel, and institutional policies necessary for AI adoption. Supervisors and administrators often have limited awareness or capacity to utilize AI-driven tools that could automate supervision, analyze data trends, and predict areas needing intervention. This technological gap widens the disparity between global educational standards and local practices, leaving the region's secondary education system struggling to meet the demands of 21st-century learning and sustainable development goals.

The persistent inefficiency in supervision and the slow adoption of AI technologies pose a serious threat to the sustainability of secondary education in the South-South geopolitical zone. Without effective integration of AI into supervisory processes, schools may continue to experience poor accountability, irregular monitoring, and data deficits that hinder informed policy actions and continuous improvement. Therefore, the problem of this study is the apparent lack of integration of Artificial Intelligence into school supervision, which has limited the capacity of education managers to ensure sustainable quality education delivery in secondary schools within the South-South geopolitical zone of Nigeria.

Purpose of the study

1. The purpose of this study was to examine the integration of Artificial Intelligence (AI) in school supervision in the South-South geopolitical zone of Nigeria. Specifically, the study aims to:
2. Determine the extent to which Artificial Intelligence is integrated into school supervision practices in secondary schools in the South-South geopolitical zone of Nigeria.
3. Identify the perceived benefits of integrating Artificial Intelligence into supervision of secondary schools in the South-South zone.
4. Examine the challenges hindering the effective integration of Artificial Intelligence into school supervision in the South-South geopolitical zone of Nigeria.
5. Propose strategies for enhancing the effective integration of Artificial Intelligence into school supervision for sustainable secondary education in the region.

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Research questions

The following questions were raised to direct the study:

i. To what extent is Artificial Intelligence currently integrated into school supervision practices in secondary schools in the South-South geopolitical zone of Nigeria?
ii. What are the perceived benefits of integrating Artificial Intelligence into the supervision of secondary schools in the South-South zone?
iii. What challenges hinder the effective integration of Artificial Intelligence into school supervision in the South-South geopolitical zone of Nigeria?
iv. What strategies can enhance the effective integration of Artificial Intelligence into school supervision in the region?

Methodology

The study adopted a survey research design to investigate the integration of Artificial Intelligence (AI) into school supervision in the South-South geopolitical zone of Nigeria. The choice of this design was informed by its suitability for collecting and analyzing data from a large population to describe existing conditions, opinions, and relationships among variables. The population of the study comprised all principals and vice-principals of public and private secondary schools across the six states of the South-South geopolitical zone - Akwa Ibom, Cross River, Rivers, Bayelsa, Delta, and Edo States. According to records from the Federal Ministry of Education (2025), there are 6,420 principals and vice-principals across these States. From this population, a sample of 642 respondents, representing 10% of the total population, was selected through a combination of stratified random sampling (to ensure proportional representation of public schools) and purposive sampling (to include school leaders directly involved in supervision and administrative decision-making)

The main instrument for data collection was a structured questionnaire titled Artificial Intelligence Integration in School Supervision Questionnaire (AIISSQ), developed by the researchers and validated by experts in Educational Administration, Educational Technology, and Measurement and Evaluation. The questionnaire consisted of 30 items and the responses were rated on a 4-point Likert scale with options: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The instrument's validity was established through expert review to ensure content and construct adequacy, while its reliability was confirmed through a pilot test conducted among 60 principals and vice-principals from schools in a neighboring geopolitical zone not included in the main study. Using the Cronbach Alpha method, a reliability coefficient of 0.89 was obtained, signifying a high level of internal consistency and reliability.

Data collection was conducted with the assistance of four trained research assistants who ensured proper administration of the questionnaire across the sampled states over a period of four weeks. Respondents were adequately briefed on the study's purpose, confidentiality, and voluntary participation. Completed copies of the questionnaire were retrieved and checked for completeness before analysis. The collected data were analyzed using descriptive statistics such as mean and standard deviation to answer the research questions, while the formulated hypothesis comparing public and private schools was tested using the independent t-test at 0.05 level of significance.

Presentation of results

Research question 1: To what extent is Artificial Intelligence currently integrated into school supervision practices in secondary schools in the South-South geopolitical zone of Nigeria?

Table 1: Extent of integration of artificial intelligence into school supervision practices in secondary schools in the South-South Geopolitical Zone of Nigeria (N = 642)

S/N	Item Description	Mean	S.D.	Remarks
1	AI is used to track and monitor teachers' instructional performance.	2.24	0.89	Disagree
2	Supervisors employ AI-powered tools for real-time school inspection and reporting.	2.18	0.91	Disagree
3	AI systems are used to analyze students' performance data for supervisory decisions.	2.12	0.86	Disagree
4	School administrators utilize AI-based applications for communication and supervision.	2.27	0.93	Disagree
5	AI tools are integrated into the evaluation and appraisal of teachers' performance.	2.09	0.88	Disagree
6	Schools have adequate digital infrastructure to support AI-based supervision.	1.96	0.90	Strongly Disagree

The results in Table 1 indicate that respondents generally disagreed that Artificial Intelligence has been meaningfully integrated into school supervision practices in secondary schools in the South-South geopolitical zone of Nigeria. The lowest-rated item (Mean = 1.96) relates to the adequacy of digital infrastructure to support AI-based supervision, showing strong disagreement on the availability of essential technological facilities. Other items such as AI use for teacher evaluation (Mean = 2.09), student performance analysis (Mean = 2.12), and AI-powered school inspection (Mean = 2.18) also received low mean scores, indicating limited application. Even the highest-rated item (Mean = 2.27) on the use of AI-based applications for communication and supervision still falls within the "Disagree" category, confirming that the integration of AI into school supervision in the South-South geopolitical zone remains low and underdeveloped.

Research question 2: What are the perceived benefits of integrating Artificial Intelligence into the supervision of secondary schools in the South-South zone?

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Table 2: Perceived benefits of integrating Artificial Intelligence into the supervision of secondary schools in the South-South zone (N = 642)

S/N	Items Description	Mean	S.D.	Remarks
1	AI improves the accuracy and timeliness of school supervision reports.	3.42	0.81	Agree
2	AI facilitates real-time monitoring of teachers' instructional performance.	3.36	0.84	Agree
3	The use of AI enhances transparency and reduces human bias in supervision.	3.51	0.77	Agree
4	AI assists supervisors in efficiently analyzing large volumes of school data.	3.48	0.80	Agree
5	AI integration supports better feedback and decision-making in school management.	3.39	0.83	Agree
6	AI-driven supervision improves accountability and overall school performance.	3.46	0.79	Agree

The results presented in Table 2 indicate that respondents generally agreed that integrating Artificial Intelligence (AI) into school supervision practices offers substantial benefits to secondary education management in the South-South zone. The highest-rated item (Mean = 3.51) reflects agreement that AI enhances transparency and reduces human bias during supervision, emphasizing its potential to ensure fairness and objectivity in evaluation processes. Similarly, respondents agreed that AI supports the efficient analysis of large volumes of school data (Mean = 3.48) and improves accountability and school performance (Mean = 3.46), highlighting its role in promoting data-driven supervision. Other notable benefits include AI's ability to improve the accuracy and timeliness of supervision reports (Mean = 3.42) and facilitate real-time monitoring of instructional performance (Mean = 3.36), both of which can lead to more responsive and effective oversight. Additionally, AI was perceived to enhance feedback and decision-making (Mean = 3.39), contributing to more strategic and evidence-based management practices. Overall, these findings suggest that stakeholders recognize AI as a valuable tool for transforming traditional supervision into a more efficient, transparent, and performance-oriented process.

Research question 3: What challenges hinder the effective integration of Artificial Intelligence into school supervision in the South-South geopolitical zone of Nigeria?

Table 3: Challenges hindering the effective integration of Artificial Intelligence in school supervision in the South-South geopolitical zone of Nigeria (N = 642)

S/N	Items Description	Mean	S.D.	Remarks
1	There is inadequate funding for AI infrastructure and tools in schools.	3.68	0.74	Agree
2	Most supervisors lack adequate training and technical skills for AI use.	3.72	0.71	Agree
3	Poor internet connectivity and unreliable electricity affect AI operations.	3.61	0.77	Agree
4	Resistance to technological change among supervisors and teachers limits AI adoption.	3.54	0.82	Agree
5	There is limited availability of locally relevant AI applications for school supervision.	3.49	0.79	Agree
6	Weak government policy and regulatory framework hinder AI integration.	3.57	0.75	Agree

The results in Table 3 show that respondents generally agreed that several challenges hinder the effective integration of Artificial Intelligence in school supervision across the South-South geopolitical zone. The most significant challenge identified was the lack of adequate training and technical skills among supervisors (Mean = 3.72), suggesting that human capacity remains a critical barrier to AI adoption. Inadequate funding for AI infrastructure (Mean = 3.68) was also strongly agreed upon, reflecting the financial constraints faced by most secondary schools and education boards in the region. Similarly, poor internet connectivity and unstable electricity supply (Mean = 3.61) were identified as infrastructural obstacles that limit the consistent operation of AI-powered systems. Respondents further indicated that resistance to technological change (Mean = 3.54) among education personnel impedes implementation efforts, pointing to attitudinal barriers that must be addressed through sensitization and training. Moreover, limited availability of contextually suitable AI applications (Mean = 3.49) and weak policy frameworks (Mean = 3.57) were recognized as institutional challenges that undermine sustainable integration. Overall, these findings suggest that while the benefits of AI in school supervision are well recognized, its effective implementation is constrained by inadequate capacity, infrastructure, funding, and supportive policy environment.

Research question 4: What strategies can enhance the effective integration of Artificial Intelligence into school supervision in the region?

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Table 4: Strategies for enhancing the effective integration of Artificial Intelligence into school supervision in the South-South region (N = 642)

S/N	Items Description	Mean	S.D.	Remarks
1	Government should provide adequate funding for AI infrastructure and digital resources in schools.	3.74	0.71	Agree
2	Regular training and capacity-building programmes on AI applications should be organized for supervisors and teachers.	3.81	0.69	Agree
3	Reliable internet connectivity and electricity should be ensured to support AI-based supervision.	3.68	0.73	Agree
4	Policies and frameworks should be developed to guide the ethical and effective use of AI in school supervision.	3.72	0.70	Agree
5	Partnerships with technology firms and universities should be encouraged to promote AI innovations in education.	3.66	0.75	Agree
6	Awareness campaigns should be conducted to reduce resistance to AI adoption among school personnel.	3.63	0.78	Agree

The results in Table 4 reveal that respondents generally agreed on several key strategies that can enhance the effective integration of Artificial Intelligence (AI) into school supervision in the South-South region. The highest-rated strategy (Mean = 3.81) emphasizes the need for regular training and capacity-building programmes for supervisors and teachers, highlighting the importance of human competence in driving AI adoption. Similarly, respondents strongly agreed that adequate government funding for AI infrastructure and digital resources (Mean = 3.74) is critical to ensuring successful implementation. Ensuring reliable internet connectivity and electricity (Mean = 3.68) was also identified as a vital infrastructural requirement to sustain AI operations, while the development of clear policies and ethical frameworks (Mean = 3.72) was seen as necessary for guiding safe and responsible AI integration. Moreover, respondents agreed that fostering partnerships with technology firms and higher institutions (Mean = 3.66) can promote innovation, research collaboration, and resource sharing for effective AI deployment. Finally, conducting awareness and sensitization campaigns (Mean = 3.63) was recognized as an important strategy to overcome resistance to change among educators and supervisors. Therefore, these findings underscore that achieving sustainable AI integration in school supervision requires a multi-dimensional approach, combining funding, policy support, infrastructure, training, collaboration, and attitudinal change.

Discussion of the findings

The findings of the study revealed that the extent of integration of Artificial Intelligence (AI) in the supervision of schools within the South-South geopolitical zone of Nigeria remains low. Respondents generally disagreed that human–AI partnerships have been meaningfully integrated into educational supervision and instructional delivery. This finding implies that AI adoption is still at an early stage, with minimal practical application in most schools. This agrees with the observations of Adams and Uzoigwe (2023), who noted that the integration of AI technologies in Nigerian educational systems has been slow due to infrastructural and capacity challenges. Similarly, Ekanem and Uzoigwe (2023) emphasized that while the

potential of AI in enhancing school supervision is high, its operationalization remains limited by systemic constraints such as lack of funding and inadequate training.

On the perceived benefits of integrating AI into school supervision, the findings revealed strong agreement that AI can enhance supervision through improved accuracy, transparency, data management, and decision-making efficiency. Respondents acknowledged that AI helps eliminate bias, streamline data analysis, and ensure timely feedback to improve teacher performance and school accountability. This aligns with Ayang et al. (2025), who asserted that digital innovations such as AI and machine learning strengthen monitoring and evaluation mechanisms, thereby improving institutional quality. In the same vein, Effiom et al. (2024) reported that AI-based systems significantly support educational decision-making by offering real-time data analytics that guide school administrators toward evidence-based management.

Regarding the challenges hindering AI integration, findings showed that poor funding, lack of training, weak infrastructure, policy gaps, and resistance to technological change are major obstacles. The results confirm that both institutional and human capacity deficiencies contribute to the slow pace of adoption. This resonates with the findings of Mbon and Uzoigwe (2023), who observed that inadequate technical competence and limited access to digital infrastructure impede the effectiveness of AI in educational administration. Likewise, Inah et al. (2024) emphasized that many supervisory officers in the South-South region are ill-equipped for the digital transition required for AI-driven school management, calling for targeted policy and capacity-building interventions.

On strategies, the study proposed government funding, policy reforms, infrastructure improvement, partnerships, and awareness campaigns as crucial for enhancing AI integration. Consistent with Ategwu et al. (2022) and Adejoh and Uzoigwe (2023), effective integration requires collaborative efforts among policymakers, educators, and technology experts to transform school supervision systems into efficient, transparent, and sustainable structures powered by Artificial Intelligence.

Conclusion

The study concludes that Artificial Intelligence has a transformative potential in enhancing school supervision through improved efficiency, accuracy, and data-driven decision-making. However, challenges such as inadequate infrastructure, limited technical expertise, and resistance to innovation hinder its full integration.

Recommendations

Based on the findings of this study, the following were recommended thus:

1. Government and educational authorities should provide adequate digital infrastructure and stable internet connectivity to support the seamless integration of Artificial Intelligence in school supervision.
2. Regular training and capacity-building workshops should be organized for school supervisors and administrators to enhance their competence in utilizing AI tools effectively.
3. Policies promoting the adoption and ethical use of AI in education should be developed and implemented to ensure standardization and sustainability across secondary schools.

4. Collaboration between schools, technology experts, and AI solution providers should be strengthened to design context-specific supervisory tools that address local challenges.

5. Adequate funding should be allocated to research and innovation in educational technology to ensure continuous improvement and adaptation of AI-driven supervision systems for better outcomes in secondary education.

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