
UTILIZATION OF ARTIFICIAL INTELLIGENCE (AI) IN SCHOOL SUPERVISION FOR IMPROVED INSTRUCTION IN PUBLIC SECONDARY SCHOOLS IN ENUGU EDUCATION ZONE

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Abstract

The study investigated utilization of Artificial Intelligence (AI) in School Supervision for improved instructional delivery in public secondary schools in Enugu Education Zone, Enugu State, Nigeria. Descriptive survey design was adopted for the study. Two research questions with corresponding hypotheses guided the study. The population of the study was 1609. Multi-stage sampling technique was used to draw 351 comprising 33 principals and 318 teachers. A questionnaire named Artificial Intelligence in Secondary Schools Supervision Questionnaire (AISSSQ) was the instrument used for data collection. The instrument was face validated by three specialists from the Faculty of Education, University of Nigeria, Nsukka. Cronbach's Alpha reliability test was used to determine the reliability of the instrument. The overall reliability coefficient yielded an index of 0.94 which indicated that the instrument was reliable for the study. Data were collected through direct administration of the instruments to respondents. Mean scores and standard deviation were used to answer the research questions, while t-test statistics was used to test the hypotheses at 0.05 level of significance. The findings of the study showed that to a high extent, AI can be utilized for instructional supervision in secondary schools, and can be utilized in the management of secondary schools' resources in Enugu Education Zone. The researchers recommended that Enugu State government should extend the SMART programme to all public secondary schools in the state, government should provide technological infrastructure, and governments should provide adequate AI tools, training, and capacity-building programs for educators in secondary schools in Enugu Education Zone.

Keywords: Artificial intelligence, school supervision, instructional delivery

Introduction

Quality instruction stands as a cornerstone of effective education system, significantly influencing students learning outcomes and overall educational attainment. Quality instruction in secondary schools involves standards-based, differentiated, and engaging teaching that uses data to meet individual student needs and this can be achieved through effective supervision. Effective supervision in schools is a key element of quality assurance which aims at achieving academic excellence through quality teaching and learning. Traditional supervision practices are largely manual, time-consuming, making it difficult to monitor schools regularly and thoroughly, and often ineffective in addressing emerging issues such as teacher absenteeism, poor instructional delivery, inadequate monitoring of students' progress, and limited feedback mechanisms (Egbai & Uzoigwe, 2015). It relies heavily on human judgment, which can be subjective and lead to inconsistent evaluations. Without real-time data, supervisors struggle to make timely and informed decisions. 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 and unproductive. These systemic inefficiencies have contributed to the declining educational standards, low students' performance, the overall ineffectiveness of school supervision and unsustainable school management practices across secondary schools in Nigeria. 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 school supervision tasks, analyze real-time data on teacher and student performance, identify instructional gaps, and provide predictive insights for decision-making.

School supervision is the act of overseeing, guiding, and improving the teaching and learning activities within a school. It involves supporting teachers, managing the school's instructional resources and ensuring educational standards are met, and helping create a productive learning environment for students. Chogwu and Adi (2024) defined school supervision as leadership aimed at improving instruction and student learning which plays a vital role in enhancing teaching quality. Ogunleye and Olanrewaju (2022) described school supervision as activities aimed at enhancing teacher performance, student learning outcomes, and overall school effectiveness through systematic monitoring and support. Simply put, school supervision is the process of overseeing and guiding the teaching and learning activities in a school, and management of school instructional resources to ensure quality education. In Nigeria, supervision remains crucial due to the ongoing challenges related to resource management, instructional consistency, and teacher support across schools (Njoku, 2023). However, in most secondary schools within Enugu Education Zone, utilization of AI tools into supervision practices remains at a minimal level. The adoption of AI by schools is justified, because according to Akpan (2020), the traditional approaches to supervision is often reliant on periodic visits and paper-based assessments, has limitations in terms of expandability, timeliness, and depth of insights. However, the rapid evolution of artificial intelligence (AI) offers an opportunity to revolutionize school supervision, making it more responsive, data-driven, and efficient. AI technologies, including machine learning and data analytics, enable supervisors to gather real-time insights into classroom practices, student performance, and teacher effectiveness, facilitating prompt and informed decision-making (Eze & Anya, 2021). Hence, Enugu State government has dichotomized public secondary schools into the SMART schools and the old schools, with the SMART schools being provided with the needed support for adoption of AI in school supervision and the old schools left to self-help.

Artificial Intelligence (AI) is one of the most transformative innovations reshaping education, offering solutions to longstanding challenges while introducing new possibilities. AI-powered tools enhance personalized learning, automate administrative tasks, and improve accessibility for students with diverse learning needs. Kendrill (2024) defined AI as a set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand and translate spoken and written language, analyze data, and make recommendations. Glover (2024) stated that Artificial intelligence is the technology that allows machines to simulate human intelligence and cognitive capabilities. Simply put, AI is the technology that refers to a set of computer tools that perform tasks that require human intelligence as applicable to education and which allows the simulation of human intelligence processes by machines, especially computers. The primary goal of AI is to create systems capable of performing tasks that typically require human intelligence, such as visual perception, speech recognition,

decision-making, and language translation. The meaning and uses of AI is further portrayed in these definitions. Today, AI is being applied as assistive technology in school supervision. It is being used for instructional supervision, evaluating teachers' performance and management of school resources. Fisher (2017) stated that instructional supervision include all mechanisms that have the purpose of stimulating teachers towards the improvement of their professional practices while Igwe and Nwajiuba (2015) viewed instructional supervision as the activity of overseeing, evaluating and coordinating the processes of enhancing instructional practices. From these, it is simply asserted that instructional supervision entails all activities of supervising the planning, execution and assessment of instructional delivery in order to achieve educational goals. AI can be integrated in school supervision to improve instructional supervision as it assists in many ways.

AI application enhances quality teaching, from intelligent tutoring systems to AI-driven analytics that predict student performance. It is useful for content analysis which can review teaching materials for bias, accuracy, and curriculum alignment. It is also used for lesson planning support, the intelligent tools can help teachers design engaging, standard-aligned lessons faster (Nwuke & Yellowe, 2025). This was confirmed by Shehu (2023) who stated that school curriculum implementation objectives can be achieved via deployment of technological facilities such as artificial intelligences. These technologies are revolutionizing traditional teaching methods. Moreover, the scholar further stated that AI fosters adaptability by continuously analyzing educational trends, ensuring that curricula remain relevant in an ever-changing world. As the education sector embraces AI, the future of education promises to be more efficient, inclusive, and responsive to individual learning styles. AI makes the job of the teachers easier; it brings more efficiency and also serves as tool for evaluating teachers' performances.

There are AI tools that can evaluate teacher-student interaction, class engagement, and adherence to lesson plans. Nwuke and Yellowe (2025) stated that AI tools provide personalized feedback based on classroom interactions and student performance data. This feedback highlights specific areas for improvement, such as time management, the use of teaching aids, or engagement strategies, enabling teachers to refine their practices and enhance learning outcomes. Also, sentiment analysis gives feedback or classroom discourse to assess teacher effectiveness or student mood. Moreover, AI technologies provide a more robust framework for evaluating teacher performance by utilizing data-driven tools and analytics to generate comprehensive insights into teaching effectiveness (Chukwu & Ekene, 2022). AI algorithms analyze vast amounts of data, including students' progress, performance, and preferences, to tailor educational experiences. Alexandara (2023) explained that AI has the potential to revolutionize the education sector by enhancing learning experiences, supporting and evaluating teachers, and offering more personalized learning opportunities for students.

Some empirical studies attest to the potentials of using AI in instructional supervision. Ugwuoti, Ugochukwu, and Ugoeze (2023) carried out a study on the use of Artificial intelligence - Based Tools for Teaching Biology and found that AI can be used for instructional supervision but that there is a limited experience. Okunade (2024) in a study on the role of AI in teaching of science education in secondary schools in Nigeria, equally found that AI is useful in teaching science education, emphasizing Adaptive Learning Systems (ALS), Intelligent Tutoring Systems (ITS), Virtual Laboratories and Simulations. Also, Ahmed, Bashir and Abubakar (2024) whose study on the application of AI in curriculum implementation revealed that AI aided the implementation of school

curriculum in the public secondary schools in federal capital territory. Ukata and Amini (2025) explored the power of AI for improving the teaching of business education courses and found that all types of AI are very powerful for improving the teaching of business education courses. The study found that if AI is included in the teaching of business education courses, it will transform the programme positively, lead to AI skills development and enable the learners acquire the needed AI employability skills for the global workplace. Also, Chu (2025) study found that integrating AI can aid school administrators in making data-driven decisions, optimizing instructional strategies, and ensuring curriculum effectiveness. Alexandara (2023) stated that teachers must be equipped with knowledge and strategies they will need to use this new technology to improve and streamline everyday processes, classroom implementation and general school administration which is inclusive of management of school instructional resources.

Instructional resources management is very important in school supervision, According to Amber (2024), instructional resource management involves effectively planning, allocating, and utilizing instructional resources to achieve desired goals and maximize efficiency. Eke (2020) defined it as the prudent utilization and maintenance of human, material, financial and other available instructional resources for the optimal achievement of educational goals and objectives. In practice, schools' resources management involves planning and allocating financial, human, and material resources efficiently. It ensures that staff, facilities, and supplies support educational goals. Effective management improves student outcomes and overall school performance. AI is useful for the management of school resources that are related to school supervision and support for other administrative tasks, hence, Adetarami and Okeke (2025) asserted that AI is applied in overall school management, specifically in financial management, personalized teaching, data and learning analytics, scheduling, communication with parents, writing, resource management, automated administrative tasks, school facilities management and assistive technologies for students with special needs. For school resources related to curriculum, instruction and teachers' development, AI can be used to monitor inventory levels (books and teaching aids, uniforms, digital tools), automate restocking, and track loss or misuse and this improves accountability and reduces waste. Anglen (2024) stated that AI-powered inventory management utilizes algorithms and machine learning to analyze data and make informed decisions regarding inventory control. Newsome (2025) submitted that AI is an invaluable assistant, helping educators personalize learning, provide instant feedback, and reduce administrative burdens. It enables teachers focus on what truly matters - engaging with students and supporting their development. This supports the fact that AI is used for managing chalkboards and projectors, laboratory equipment and chemicals, teacher and students support, school plant and classroom management, among others.

Utilization of AI in school supervision cannot be overemphasised. Chogwu and Adi (2024) carried out a study on AI, school supervision and school resources management in public secondary schools in Abuja to evaluate how AI affects the supervision of schools and management of school resources. The study found a significant correlation between artificial intelligence and successful school supervision in public senior secondary schools. It was established that there exists a noteworthy relationship between artificial intelligence and effective management of school resources. Okonkwo (2024) equally investigated Educational Management and AI in Nigerian Schools to examine the impact of AI on educational resource management in Nigerian schools. The study found that AI has aided transformation of educational sector in Nigeria; it found that artificial intelligence has

aided effective educational management, resources management, teaching and learning processes and educational supervision. Obona and Onyebu (2024) studied the contribution of AI in the management of financial and human resources in secondary schools in Cross Rivers State, Nigeria and found that AI significantly contributes to the management of financial and human resources in public secondary schools. AI enhances efficiency in budgeting, accounting, and resource distribution, while also supporting more effective data management and decision-making related to students. Karatzas and Zogopoulos (2024) examined Management of School Units and AI: Applications and Concerns and found that AI is applied in school administration and is supportive in decision making, resource management, communication and school security. The potentials of AI in schools cannot be underscored, all the supervisors and educators need is to be adequately trained for skills in AI application so that it can be successfully utilized in secondary schools and instructional supervision.

Secondary education is one of the levels of education in Nigeria. Hammill (2025) stated that, secondary education is the stage of education that follows primary education and typically includes middle and high school education and vocational or technical training. Its main focus is to prepare students for further education or for entering college or the workforce. Contextually, secondary education is the education level between primary and higher education, usually serving students aged 12 to 18. The broad goals of secondary education shall be to prepare the individual for useful living within the society and higher education (FRN, 2014). Secondary Education is the budding ground for future professionals as well as the foundation for the discovering and classification of the specific fields of professions. The objectives of secondary education can only be realized when quality education and good management of the schools are offered, the management of secondary schools means running the schools along the desired educational policies. It takes into account all aspects of the school (policies, material and human resources, programmes, activities and equipment) and integrates them into a useful whole (Kirthika, 2022). The Nigerian secondary school system is increasingly becoming prone to the application of Artificial Intelligence (AI), driven by the need to enhance quality learning experiences, improve administrative efficiency, and address educational challenges. On the 25th of February, 2025, Tolu-Kolawole reported in the Punch newspapers that the federal government of Nigeria has launched an Artificial Intelligence training programme to equip 6,000 selected senior secondary school teachers across the 36 states and the Federal Capital Territory. The initiative by the National Senior Secondary Education Commission is to integrate AI into education system, to enhance teaching methods and empower educators with the skills to prepare students for a technology-driven future. With advancements in technology and the gradual digital transformation in the country's education sector, AI is finding its way into various aspects of secondary school operations.

Another step the federal government of Nigeria has taken to promote the advancement of Artificial Intelligence in the country was the formation of National Agency for Research in Robotics and Artificial Intelligence (NARRAI) in 2018. According to the then Minister of Science and Technology, Dr. Ogbonnaya Onu, in 2018, NARRAI would coordinate and control all researches relating to AI and robotics. The significance of this is that with the intervention of the government and by integrating AI into education, Nigeria can enhance teaching, improve learning outcomes, and provide students with personalized educational experiences. Sule (2024) stated that AI comes with numerous opportunities for the educational system in Nigeria could help students create personalized learning outcomes. Therefore, the application of AI in Nigerian schools is in

compliance with new global practices in education, and it is proving to be very supportive in guaranteeing quality and solving problems. Each state in Nigeria is evolving in the application of AI into the education system and Enugu State is not an exception. Enugu State has 6 education zones and 314 public secondary schools. The State has shown great commitment in harnessing the power of Artificial Intelligence (AI) to transform learning experience in schools. This explains why the government is carrying out policies to support technological inspired education system, one of such policies is the SMART and GREEN schools. The governor initiated the construction of 260 schools across the 260 wards in the state. According to NgIMUN (2024), the 260 basic education schools are SMART because they are equipped with modern information and communication amenities and services to leverage global digitalized education resources and optimize e-learning systems to achieve the delivery of a rigorous and inclusive curriculum within a safe learning environment. The schools are GREEN because they are the models of community-based circular economy of waste management and reduction of greenhouse emissions.

The strides of Enugu State in implementing technology supported quality education system is not going unnoticed, this informed why at the 12th National Council on Communications, Innovation, and Digital Economy (NCCIDE) which took place on the 2nd to 6th, December, 2024 at the NNAM Hall Complex and Hotel Makurdi, Benue State, Enugu State Government was awarded the Best in Digital Technology Human Capital in Nigeria. The state Commissioner for Innovation, Science, and Technology, Dr. Prince Lawrence Ezech who received the award on behalf of the State governor stated that Governor Mbah has made significant strides in ensuring that Enugu State is equipped to engage with emerging technologies while driving innovation across various sectors. Hence, Professor Ndubueze Mbah, the Enugu State Commissioner for Education at the World International Education Day in Enugu State on the 24th of January, 2025 declared that the state is part of the global conversation on AI and education and is committed to harnessing the potential of AI to improve learning outcomes and equip students with the skills they need to succeed in 21st century. The application of AI technology in secondary schools in Enugu State has the potentials to significantly transform the teaching and learning experience.

However, the situation where the government directs all attentions to the SMART and GREEN schools would affect the implementation of the AI policy in the old existing schools across the state. Utilizing AI in instructional supervision would erode the traditional supervision practices which are largely manual, time-consuming, making it difficult to monitor schools regularly as well as ineffective in addressing the emerging issues like poor instructional delivery, inadequate monitoring of students' progress, and limited feedback mechanisms as stated by Egbai and Uzoigwe (2015). Continuing with the traditional practices would make supervisors and principals 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 and unproductive. This has set the tone for investigation into using AI in supervision for improved instruction in Enugu Education Zone. It is believed that if government implements uniform policies, provide adequate training for teachers and principals, and ensure responsible usage of technology and when integrated effectively, applications of AI in secondary schools can create a more dynamic, inclusive, and efficient learning environment, preparing students for the demands of the modern world.

Statement of the Problem

One of the key aspects of school administration is school supervision which involves instructional supervision, evaluation of teachers' performance and management of school's instructional resources. Traditional management approaches often fall short in addressing issues, resulting in a gap between administrative efficiency and student outcome and this prompted the adoption of technological approach to school supervision, involving Artificial Intelligence use in school supervision. Utilization of AI in school supervision has revolutionized teaching and learning processes globally, it offers innovative solutions such as personalized learning, automated grading, assistive in teacher's evaluation, and data-driven decision-making. However, schools in developing countries such as Nigeria often face barriers that hinder effective implementation of these technologies, and this extends to Enugu Education Zone. The most conspicuous intervention of the state government in implementing AI in the state schools was the establishment of 260 SMART and GREEN schools, the schools are being provided with the right resources to meet global requirements for AI application, and this is done to the detriment of the old existing schools. Since the old secondary schools struggle to meet up with global trends, the perceived understanding of the utilization of AI in the schools with little or no government support is a gap that needs to be studied because the state is presumed to present equal learning opportunities for all learners in public schools in the state. The exclusion of some schools became source of worry for the researchers.

Purpose of the Study

The general purpose of this study was to investigate the extent to which Artificial Intelligence can be utilized for improved supervision in public secondary schools in Enugu Education Zone, Enugu State, Nigeria.

Specifically, the study intended to determine the:

1. extent to which AI can be utilized for instructional supervision in public secondary schools in Enugu Education Zone.
2. extent to which AI can be utilized in the management of instructional resources in public secondary schools in Enugu Education Zone.

Research Questions

The following research questions guided the study:

1. To what extent can AI be utilized for instructional supervision in public secondary schools in Enugu Education Zone?
2. To what extent can AI can be utilized in the management of public secondary schools' instructional resources in Enugu Education Zone?

Hypothesis

The following hypotheses guided the study:

- H₀₁:** There is no significant difference in the mean ratings of principals and teachers on the extent to which AI can be utilized for instructional supervision in public secondary schools in Enugu Education Zone.
- H₀₂:** There is no significant difference in the mean ratings of principals and teachers on the extent to which AI can be utilized in the management of instructional resources in public secondary schools in Enugu Education Zone.

Methods

The study adopted descriptive survey research design. The population of the study was 1609 staff comprising 33 principals and 1576 teachers in the 33 public secondary schools in the three LGAs in Enugu Education Zone. The sample size was 351 respondents made up of the 33 principals of the public secondary schools in the zone and

318 teachers obtained through multi-stage sampling technique. Firstly, Taro Yamane's sampling formula was used to determine the sample size of 318 out of the 1576 teachers' population. Secondly, stratified proportionate random sampling technique was used to distribute the sample of 318 respondents in the 3 local governments areas and across the 33 public secondary schools accordingly. The instrument used for data collection was structured questionnaire titled Artificial Intelligence in Secondary Schools Supervision Questionnaire (AISSSQ) developed by the researchers. The item has a four point rating scale of Very High Extent (VHE-4), High Extent (HE-3), Low Extent (LE-2) and Very Low Extent (VLE-1) for the research questions. The instrument was face validated to determine the validity by two experts in Educational Administration and Planning, and one in Measurement and Evaluation, UNN, their suggestions, contributions and corrections were incorporated into the final draft of the questionnaire. The reliability of the instrument was established using internal consistency through Cronbach Alpha method. The reliability coefficients obtained from the clusters were 0.87 and 0.78 and overall index of 0.94. Mean and standard deviation were used to answer the research questions, while t-test statistics was used to test the hypotheses at 0.05 level of significance. Real limit of numbers was used to interpret the results in clusters with response mode of VHE=3.50-4.00, HE=2.50-3.49, LE=1.50-2.49 and VLE=0.50-1.49 for research question, while the criterion mean of 2.50 and above was used as acceptance and below as not accepted.

Results

Research Question 1: To what extent can AI be utilized for instructional supervision in secondary schools in Enugu Education Zone?

Table 1: Mean and standard deviation on the extent to which AI be utilized for instructional supervision in public secondary schools in Enugu Education Zone

S/N	Items	Principals			Teachers		
		$\bar{x}$	SD	Decision	$\bar{x}$	SD	Decision
01	AI is used for curriculum planning and analysis	2.77	.97	HE	2.81	1.13	HE
02	It is used for personalized learning	3.53	.45	VHE	2.72	1.18	HE
03	It is used for instructional quality monitoring	2.26	1.05	LE	1.89	.93	LE
04	AI assists in real-time c/room observation/feedback	2.58	1.04	HE	2.33	1.07	LE
05	AI supervises quality teaching through gamification and simulation	3.10	.95	HE	2.89	1.08	HE
06	It provides data driven insights to guide educators	2.84	.88	HE	2.73	1.09	HE
07	It is useful for assessment feedback automation	3.42	.83	HE	1.82	1.00	LE
08	It offers educators professional development support	3.57	.51	VHE	3.75	.48	VHE
09	It enhances curriculum development	3.10	.93	HE	2.67	1.11	HE

10	AI is useful for curriculum alignment with job market trends	2.75	1.06	HE	3.21	.89	HE
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Cluster Mean and Standard Deviation	2.99	.87	HE	2.68	1.00	HE
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3.50-4.00 will be regarded as Very High Extent, 2.50-3.49 as High Extent, 1.50-2.49 as Low Extent and 0.01 – 1.49 as very low extent.

Table 1 shows the mean and standard deviation of principals' and teachers' responses on the extent to which AI can be utilized for instructional supervision. From the table, the principals' mean ratings ranged from 2.26 to 3.57, while the teachers' mean ratings ranged from 1.82 to 3.75. With mean values of 3.53 and 3.57 for items 2 and 8 respectively, these indicate Very High Extent and the mean of all other items in the cluster indicate High Extent. The principals' cluster mean of 2.99 with a standard deviation of 0.87 indicates High Extent, whereas the teachers' mean values of 3.75 for item 8 indicates Very High Extent in consonance with the principals', in item 2, the teachers mean of 2.72 indicates High Extent in contrast to the principals', also in items 3,4 and 7 with mean of 1.89, 2.33 and 1.82 respectively which indicates Low Extent in contrast to the principals'. Teachers' cluster mean of 2.68 with a standard deviation of 1.00 also indicates a High Extent AI can be utilized for instructional supervision.

H₀₁: There is no significant difference between the mean ratings of principals and teachers on the extent to which AI can be utilized for instructional supervision in secondary schools in Enugu Education Zone.

Table 2: t-test calculation of the difference between the mean ratings of principals and teachers on the extent to which AI can be utilized for instructional supervision in public secondary schools in Enugu Education Zone

Status	N	Mean	SD	Df	t-value	P-value
Principals	31	2.99	.87	333	1.67	0.097
Teachers	304	2.68	1.00			

Data in **Table 2** revealed that the principals have mean and standard deviation scores of 2.96 and 0.87 while teachers have mean and standard deviation scores of 2.68 and 1.00 respectively. The results from the test shows $t(333) = 1.67$, $P(.097) > 0.05$. Thus, the null hypothesis of no significant difference was not rejected since the p-value (.097) is greater than 0.05 level of significance. Therefore, there is no significant difference between the mean ratings of principals and teachers on the extent to which AI can be utilized for instructional supervision in public secondary schools in Enugu Education Zone.

Research Question 3: To what extent can AI be utilized in the management of instructional resources in public secondary schools in Enugu Education Zone?

Table 5: Mean and standard deviation on the extent to which AI can be utilized in the management of instructional resources in public secondary schools in Enugu Education Zone

S/N	Items	Principals			Teachers		
		$\bar{x}$	SD	Decision	$\bar{x}$	SD	Decision
11	AI is useful for management of textbooks and teaching aids	3.03	.91	HE	3.76	.45	VHE

12	It is useful for management of laboratory equipment and chemicals	2.61	1.07	HE	2.69	.95	HE
13	It assists in scheduling or timetabling	3.74	.35	VHE	3.67	.48	VHE
14	AI is useful for management of chalkboards or whiteboards	2.35	1.06	LE	2.64	.91	HE
15	It is useful for enrolment and admissions	2.71	1.02	HE	2.71	.93	HE
16	It assists in the management of projects	2.39	1.13	LE	2.13	1.16	LE
17	It is useful in students' support services	2.87	1.13	HE	1.89	.96	LE
18	AI is useful for school plant management	2.97	.93	HE	2.88	.98	HE
19	It supports classroom management	3.26	.76	HE	2.84	.96	HE
20	AI supports the management of computer and technologies	3.59	.52	VHE	3.76	.22	VHE
Cluster Mean and Standard Deviation		2.95	.89	HE	2.90	.80	HE

3.50-4.00 will be regarded as Very High Extent, 2.50-3.49 as High Extent, 1.50-2.49 as Low Extent and 0.01 – 1.49 as very low extent.

Table 5 presents the mean and standard deviation of responses from principals and teachers on the extent to which AI can be used in managing public secondary schools' resources in Enugu Education Zone. The results reveal that the principals' mean scores ranged from 2.35 to 3.74, while the teachers' mean scores ranged from 1.89 to 3.76. The cluster mean for principals is 2.95 with a standard deviation of 0.89, and that of teachers is 2.90 with a standard deviation of 0.80. Both means fall within the range of 2.50–3.49, indicating that AI can be used to a High Extent in the management of public secondary schools' instructional resources.

H₀₃: There is no significant difference in the mean ratings of principals and teachers on the extent to which AI can be utilized in the management of instructional resources in public secondary schools in Enugu Education Zone.

Table 6: t-test calculation of the difference between the mean ratings of principals and teachers on the extent to which AI can be utilized in the management of instructional resources in public secondary schools in Enugu Education Zone

Status	N	Mean	SD	Df	t-value	P-value
Principals	31	2.95	.89	333	.30	0.764
Teachers	304	2.90	.88			

Data in **Table 6** revealed that the principals have mean and standard deviation scores of 2.95 and 0.89 while the teachers have mean and standard deviation scores of 2.90 and 0.88 respectively. The results from the test shows $t(333) = 0.30$, $P(.764) > 0.05$. Thus, the null hypothesis of no significant difference was not rejected since the p-value

(.764) is greater than 0.05 level of significance. Therefore, there is no statistically significant difference between the mean ratings of principals and teachers on the extent to which AI can be utilized in managing instructional resources in public secondary schools in the Zone.

Discussion

With reference to research question one which dealt with the extent to which AI can be utilized for instructional supervision in secondary schools in Enugu Education Zone, the findings revealed that AI to a high extent can be utilized for instructional supervision in areas of: curriculum analysis and optimization, personalized learning, instructional quality monitoring, real-time classroom observation and feedback, supervision of quality teaching through gamification and simulation, provision of data driven insights to guide educators, assessment feedback automation, educators' professional development support, curriculum development and curriculum alignment with job market trends.

The findings are also consistent with that of Ugwuoti, Ugochukwu and Ugoeze (2023) whose study found that AI can be used for instructional supervision but that there is a limited experience. The state of the usefulness of AI in instructional supervision was further supported by the findings of Okunade (2024) in a study on the role of AI in teaching of science education in secondary schools in Nigeria, the study found that AI is useful in teaching science education, emphasizing Adaptive Learning Systems (ALS), Intelligent Tutoring Systems (ITS), Virtual Laboratories and Simulations. The finding is in consonance with the results of Ahmed, Bashir and Abubakar (2024) whose study on the application of AI in curriculum implementation revealed that AI aided the implementation of school curriculum in the public secondary schools in federal capital territory. The findings of the study by Ukata and Amini (2025) on exploring the power of AI for improving the teaching of business education courses aligns with the present findings. The study found that if AI is included in the teaching of business education courses, it will transform the programme positively, lead to AI skills development and enable the learners to acquire the needed AI employability skills for the global workplace. Also, Chu (2025) found that integrating AI can aid school administrators in making data-driven decisions, optimizing instructional strategies, and ensuring curriculum effectiveness.

The hypothesis tested revealed that there is no significant difference between the mean ratings of principals and teachers on the extent to which AI can be utilized for instructional supervision in public secondary schools in Enugu Education zone. This implies that both categories of respondents opined closely along the same line, that to a high extent, AI can be used for instructional supervision in public secondary schools in Enugu education zone. It is therefore important to note that the adoption of AI for instructional supervision promotes accuracy, efficiency and objectivity in teaching practices. It supports data-informed decision-making for continuous improvement in educational quality.

With reference to research question three which dealt with the extent to which AI can be used in the management of instructional resources in public secondary schools in Enugu Education, the findings showed that to a high extent AI can be used. The Mean and Standard Deviation showed result is above the stipulated benchmark for high extent rating. The hypothesis tested also confirmed that there is no statistically significant difference between the mean ratings of principals and teachers on the extent to which AI can be utilized in managing public secondary schools' instructional resources in Enugu education

zone. These findings indicate that irrespective of the status of the respondents, they opined along the same line, that to a high extent AI can be utilized in the management of public secondary's instructional resources in Enugu Education Zone.

The mean ratings of principals and teachers showed that AI can be utilized for management of textbooks and teaching aids, for management of laboratory equipment and chemicals, assists in scheduling or timetabling, AI is useful for management of chalkboards or whiteboards, It is useful for enrolment and admissions, It assists in the management of projects, It is useful in students' support services, It is useful for school plant management, It supports classroom management and It supports the management of computer and technologies. These findings are consistent with the findings of Chogwu and Adi (2024) who carried out a study on Artificial Intelligence, school supervision and school resources management in public secondary schools in Abuja, Nigeria. The study found that there is a significant correlation between artificial intelligence and successful school supervision in public senior secondary schools in the FCT, Nigeria. Additionally, it was established that there exists a noteworthy relationship between artificial intelligence and effective management of school resources in public senior secondary schools in the FCT, Nigeria.

The study by Okonkwo (2024) which investigated educational management and Artificial Intelligence in Nigerian Schools validates the present findings, it found that AI has aided transformation of educational sector in Nigeria. Specifically, the paper discovered that AI has aided effective educational management, resources management, teaching and learning processes and educational supervision. The present findings are further corroborated by the findings of Obona and Onyebu (2024) and Karatzas and Zogopoulos (2024) whose separate studies found that AI significantly contributes to the management of financial and human resources, decision making, resource management, communication and school security.

Conclusion

The study concluded that Artificial Intelligence can be utilized to a high extent for improving school supervision in public secondary schools in Enugu Education Zone. Specifically, AI has great potential in enhancing instructional supervision through curriculum monitoring, classroom observation, assessment, professional development of teachers, and data-driven decision-making. The study also established that AI can be effectively utilized in the management of instructional resources such as teaching materials, laboratory facilities, school timetables, enrolment processes, student support services, and other school resources. Furthermore, the study revealed that both principals and teachers shared similar opinions on the usefulness of AI, as there was no significant difference in their mean ratings. Therefore, the integration of AI into school supervision can improve efficiency, accountability, and the overall quality of instruction in public secondary schools.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. The Enugu State Government should provide adequate Artificial Intelligence facilities and technological infrastructure in all public secondary schools to support effective instructional supervision and school resource management.
2. The Ministry of Education should organize regular training, workshops, and capacity-building programmes for principals and teachers to improve their knowledge and skills in the effective utilization of Artificial Intelligence for school supervision.

3. School principals should integrate Artificial Intelligence tools into instructional supervision and the management of instructional resources to promote data-driven decision-making, effective monitoring, and improved instructional delivery.
4. The Enugu State Government should expand and sustain the SMART School Programme across all public secondary schools in the state to ensure wider access to Artificial Intelligence technologies and enhance effective school supervision and instructional improvement.

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