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**RELATIONSHIP BETWEEN PERCEIVED USE OF ARTIFICIAL INTELLIGENCE-DRIVEN TOOLS
AND ADMINISTRATIVE EFFECTIVENESS IN PUBLIC SECONDARY SCHOOLS IN ANAMBRA
STATE.**

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ABSTRACT

The purpose of the study was to ascertain relationship between the perceived use of artificial intelligence-driven tools and perceived administrative effectiveness in public secondary schools in Anambra State. Correlation research design was used for the study. The population of the study consisted of 268 public secondary school principals in Anambra State. No sampling technique was done as the population is of manageable size. Data for the study were obtained collected using two sets of questionnaire. Data were analyzed using Pearson Product Moment Correlation coefficient. The findings of the study revealed that a high positive and significant relationship existed between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools. Based on the findings of the study, it was recommended among others that Ministry of Education should organize seminars and workshops for principals on the need to improve on their use of AI-driven infrastructure for administrative effectiveness.

Key Words: Perceived use, Artificial intelligence, Administrative effectiveness and Public secondary schools.

INTRODUCTION

Public secondary schools are publicly funded which implies that their financial architecture is based on the taxes paid by the citizens. Public secondary schools exclude those owned by the religious organizations, cooperate bodies, individuals and other private fee-charging independent schools. Public secondary schools are based on the ideology that education is regarded as public goods, consequently, public education is delivered to the recipients through the aid of the government. The government has absolute control of the public schools; the government built the schools, recruited the teachers and other personnel, admitted the learners and provided necessary material resources for its operation. The government ensures that adequate administrative effectiveness is put in place through the appointment of the administrative heads.

Administrative effectiveness captures the extent to which the set out goals of an institution are achieved through the mobilization of human and material resources by the institutional heads in a robust manner. It refers to the degree of accomplishment of administrative practices in a manner that is efficient and productive (Jamaica & Tagbo, 2025). It embodies several factors such as the capacity to communicate effectively, judiciously allocate resources, give direction to human resources, and by extension, adapt to vagaries of the institution. Administrative effectiveness is characterized by the implementation of policies that are tailored towards enhancing institutional performance and making contributions to the overall institutional success. In other words, administrative effectiveness ought to be targeted towards the achievement of institutional goals and objectives.

It curious to note that despite the role of administrative effectiveness towards the achievement of institutional goals and objectives in public secondary schools in Anambra State, the researcher observed a trend of administrative ineffectiveness. In line with the observation of the researcher, Igwe (2024) observed principals' archaic manner of record-keeping, students' performance tracking, obsolete attendance tracking, poor strategic decision-making among others in Anambra State. It is rather worrisome that the trend of administrative ineffectiveness has continued unabated despite conscious efforts by government in monitoring the activities of principals in Anambra State. Instructively, principals' administrative ineffectiveness in Anambra State could be linked to several factors; use of artificial intelligence-driven systems; inclusive.

Artificial intelligence (AI) is the capability of a technological tool or device to undertake the tasks required of human intelligence. Similarly, Alagbe (2023) defined AI as the capacity of a computer

or machine to mimic the abilities of the human mind – learning from various examples and experience, identifying objects, comprehending and responding to language, making decisions, proffering solutions to problems while blending these and other abilities to undertake functions a human might undertake, such as driving a car or greeting a hotel guest. This is a pointer to the fact that artificial intelligence has been programmed to undertake functions; hitherto undertaken by humans. Furthermore, artificial intelligence covers a wide range of technologies in the mould of data analytics, machine learning, and automation which are capable of impacting decision-making processes in educational institutions considerably (Akpan and Essien, 2025). For effective administration in public secondary schools, AI-driven systems could come in handy.

AI-driven systems include technologies which can be utilized to mimic the abilities of the human mind. AI-driven systems can track students' academic performance and help teachers identify learners who need additional support (Adelana & Akinyemi, 2021). It goes to show that AI-driven systems have the capacity to predict students' academic performance while separating high-achievers from low-achievers. In other words, with the use of AI-driven systems, teachers are unburdened to the extent that they pay more attention to matters that border on effective instructional delivery to the benefit of the students. In the light of Nigeria's ever-increasing students' population, the lingering challenges of teacher shortages coupled with inefficient resource allocation, AI presents an avenue for gaps to be bridged in a bid to improve administrative effectiveness in secondary schools (Fullan, Azorín, Harris & Jones 2023). AI-driven systems include AI-powered analytics and AI-driven infrastructure.

AI-powered analytics can give project managers deep insights into patterns and trends that could indicate risks, such as budget overruns, project delays, or resource shortages (Ayodeji, Olayemi & Aguda, 2024). In other words, it helps in risk management. Similarly, Ajuwon, Animashaun and Chiekezie (2024) explained that AI-powered analytics facilitate institutional forecast of staffing needs as well as budget requirements in line with data-driven insights. This can enable principals make contingency plans while identifying the most effective practices to enhancing staff welfare. AI-driven analytics can be automated to facilitate immediate feedback to students. Similarly, Pope (2020) pointed out that automated scheduling systems can create optimized class schedules through the consideration of various challenges such as teachers' availability and classroom capacity; leading to improved scheduling accuracy. Again, the adoption of automated scheduling systems with other emerging technologies, such as data analytics and cloud computing, can facilitate a more responsive educational administrative

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process (Hernandez & Lopez, 2024). These AI systems reduce manual processing and errors, thereby enhancing overall administrative effectiveness.

AI-driven infrastructure can be mindfully adopted in management of facilities. For example, AI-powered infrastructure can be utilized for the optimization of school transportation routes, logistics, improving safety and reducing costs. In addition, AI-powered infrastructure promotes administrative efficiency by the streamlining grading processes, automating attendance tracking, and optimizing timetable scheduling in such a manner that reduces teachers' workload and allows them to concentrate more on instructional activities (Ughenu, Ukandu, Okeke, Akpulue & Ughamadu, 2025). Thus, it will be interesting to unearth the relationship between the perceived use of artificial intelligence-driven tools and administrative effectiveness in public secondary schools in Anambra State.

Purpose of the Study

Specifically, the study sought to determine:

1. The relationship between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools in Anambra State.
2. The relationship between principals' use of AI-driven infrastructure and perceived administrative effectiveness in public secondary schools in Anambra State.

Research Questions

The following research questions guided the study:

1. What is the relationship between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools in Anambra State?
2. What is the relationship between principals' use of AI-driven infrastructure and perceived administrative effectiveness in public secondary schools in Anambra State?

Hypotheses

1. There is no significant relationship between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools in Anambra State.
2. There is no significant relationship between principals' perceived use of AI-driven infrastructure and perceived administrative effectiveness in public secondary schools in Anambra State.

Literature Review

The relevance of use of AI-driven systems for the enhancement of administrative effectiveness cannot be overemphasized since artificial intelligence is a mimicking of task that, otherwise, ought to be done with the use of human mind. There is the need for public secondary school principals to look in the way of AI-driven systems for administrative effectiveness. This is because, the use of technology enhances administrative tasks anywhere in the world and at any time (Pragya, 2021). AI-driven systems have aided educational administration via the provision of individuals with fundamental information communication and technological skills (Nwile & Edo, 2023). They facilitate dynamic scheduling and predictive analysis of educational tasks. This is due to technology's capacity to integrate with modern education, leading to dynamic scheduling and predictive analysis for tracking progress (Ku Chhaya & Ravindra, 2020). In the educational context, AI captures applications such as intelligent tutoring systems, predictive analytics, and automated administrative tools (Nwoye, Nwosu & Okoroji, 2024). Furthermore, AI systems can bring about management and the updating of students' records, including grades and attendance, while assisting in the creation of timetables in consideration of available faculty, room slots as well as class schedules (Arya, 2024).

The use of AI-powered systems are of paramount importance in promoting administrative effectiveness among principals in public secondary schools where there is relative high population of both students and teachers. Some of these AI-powered systems include:

AI-powdered analytics. In the course of administration, AI-powered analytics can be used for effectiveness. For example, the use of machine learning algorithms facilitates analysis of students' data and prediction of their academic performance while identifying areas of weakness of the students that are in need of remediation. Furthermore, AI tools retains the capacity to analyze trends in students' performance and institutional finances with a view to optimizing staffing levels and budget allocation in an efficient manner possible (Olatunde-Aiyedun, 2024). This strategic allocation, to all intents and purposes, facilitates the attainment of institutional goals and by extension, the improvement of overall operational effectiveness. Similarly, Kearney and Thompson (2021) emphasized that AI-driven tools, such as predictive analytics can be employed in the management of complex administrative functions, ranging from students' enrollment to staff's allocation. AI can be employed by principals to make data-driven decisions. Similarly, Mandernach *et al.* (2020) found that artificial intelligence systems can

further contribute to data analytics and predictive modeling while enabling school administrators to make data-driven decisions that improve overall institutional performance in the long run.

AI-driven infrastructure. AI can be mindfully adopted in management of facilities. For example, AI-powered sensors and monitoring systems can be utilized to optimize facilities management (Ughenu *et al.*, 2025). AI-powered smart grids reduce operational costs while improving sustainability. Purbiyanti *et al.* (2024) noted that AI-driven systems in secondary schools monitor energy utilization and suggest conservation strategies. AI-driven tools can be adopted to manage school networks, ensure cyber-security and safety of students' data.

METHOD

Research Design. The study employed correlation research design which is targeted at ascertaining relationship between variables (Nworgu, 2015). Correlation design is considered expedient for this study because it enabled the researcher to find out the nature of relationship between two variables of the use of artificial intelligence-driven tools and administrative effectiveness. The research design was considered appropriate for this study because it sought the relationship between principals' perceived use of artificial intelligence-driven tools and perceived administrative effectiveness in public secondary schools in Anambra State.

Procedure. The population of the study consisted of 268 principals in public secondary schools in Anambra State. No sampling technique was done as the population is of manageable size. Data for the study were obtained using two sets of questionnaire developed by the researcher titled "Perceived Use of Artificial Intelligence-Driven Systems Questionnaire (PUAIDSQ)" and "Perceived Administrative Effectiveness in Public Secondary Schools Questionnaire (PAEPSSQ)". PUAIDSQ was developed by the researcher and divided into two clusters. Cluster one sought information on principals' perceived use of AI-powered analytics in public secondary schools and has 10 items while cluster two sought information on principals' perceived use of AI-driven infrastructure in public secondary schools and is made up of 10 items. PUAIDSQ was constructed from literature in a way that the respondents responded by opting for one of the four response categories viz: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The PAEPSSQ was developed by the researcher from literature. It is made up of 12 items. It was developed in a way that the respondents responded by opting for one of the four response categories viz: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). PUAIDSQ and PAEPSSQ were face-validated by three experts who are lecturers in Faculty of Education, Nnamdi Azikiwe

University, Awka. The reliability of PUAIDSQ and PAEPSSQ were ascertained using Cronbach alpha method. This was carried out by administering copies of PUAIDSQ and PAEPSSQ to 15 principals with similar characteristics in Enugu State which is outside the study area. The internal consistency of the items in PUAIDSQ and PAEPSSQ were determined using Cronbach statistics to obtain reliability indices of 0.76 and 0.79. These values were considered adequate to confirm that PUAIDSQ and PAEPSSQ as reliable as they were consistent with the stipulation of Shrestha (2021) that the adequate threshold value for Cronbach alpha should be >0.70 . Data were collected using nine research assistants who were co-postgraduate students as well as public secondary school teachers in Anambra State. Their choice is justified by the depth of research knowledge and the fact that they are close to some of the principals in the sampled schools. Out of the 268 copies of PUAIDSQ and PAEPSSQ administered, 214 were retrieved; indicating 80.5% return rate and was used for the purpose of data analysis.

Data related to the research questions were analyzed using Pearson Product Moment Correlation coefficient by finding the relationship between each pair of variables. In view of the recommendation of Nwana (2007), correlation coefficients, r were interpreted thus:

0.8 – 1.0 = Very high relationship

0.6 – 0.8 = High relationship

0.4– 0.6 = Moderate relationship

0.2 – 0.4 = Low relationship

0.0 – 0.2 = Very low relationship.

In ascertaining the significance of the hypotheses, p-value was used. Where the calculated p-value is less than the stipulated level of significance (0.05), the null hypothesis was rejected. In contrast, the null hypothesis was accepted where the calculated p-value is greater than or equal to the stipulated level of significance (0.05). All analyses were done with the aid of the Statistical Package for Social Sciences (SPSS) version 22.

RESULTS

Table 1: Pearson r on Relationship between Principals' Perceived Use of AI-powered Analytics and Perceived Administrative Effectiveness in Public Secondary Schools

Source of Variation	N	r	p-value	Remark
Perceived Use of AI-Powered Analytics	214	0.752		
Perceived Administrative Effectiveness			0.00	High Positive Relationship

Data in Table 1 show that there is a high positive relationship between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools in Anambra State. This is evident by the size of Pearson's Correlation Coefficient r , which is 0.752. Furthermore, the analysis shows that there is a significant relationship between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools in Anambra State. The calculated r (0.752) has p -value < 0.05 . The null hypothesis one is therefore rejected.

Table 2: Pearson r on Relationship between Principals' Perceived Use of AI-Driven Infrastructure and Perceived Administrative Effectiveness in Public Secondary Schools

Source of Variation	N	r	p-value	Remark
Perceived Use of AI-Driven Infrastructure	214	0.693		
Perceived Administrative Effectiveness			0.01	High Positive Relationship

Results in Table 2 show that there is a high positive relationship between principals' perceived use of AI-driven infrastructure and perceived administrative effectiveness in public secondary schools in Anambra State. This is evident by the size of Pearson's Correlation Coefficient r , which is 0.693. Additionally, the analysis shows that there is a significant relationship between principals' perceived use of AI-driven infrastructure and perceived administrative effectiveness in public secondary schools in Anambra State. The calculated r (0.693) has p -value < 0.05 . The null hypothesis two is therefore rejected.

Discussion

Relationship between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools

The finding of this study is that a high positive and significant relationship existed between principals' perceived use of AI-powered analytics and perceived administrative effectiveness in public secondary schools in Anambra State. This is a depiction of the fact that the more principals deploy AI-powered analytics, the greater their administrative effectiveness. In other words the use of AI-powered analytics ensures the smooth running of the school by the principals in such a manner that tasks are accomplished with speed and accuracy. Consistent with the finding of the study is that of Olatunde-Aiyedun (2024) that AI tools retains the ability to analyze trends in students' performance and institutional finances with a view to optimizing staffing levels and budget allocation in an efficient manner possible. This strategic allocation, considerably, promotes the accomplishment of institutional goals and improves administrative effectiveness. The finding of the current study is further corroborated with that of Kearney and Thompson (2021) that AI-driven tools, such as predictive analytics can be adopted to manage intricate administrative functions such as students' enrollment and staff's allocation. Put differently, AI-powered analytics can enable the principals in making data-driven decisions. Furthermore, Mandernach *et al.* (2020) found that data analytics and predictive modeling enable school administrators to make data-driven decisions that ultimately improve overall institutional performance.

Relationship between principals' perceived use of AI-driven infrastructure and perceived administrative effectiveness in public secondary schools

The finding of this study is that a high positive and significant relationship existed between principals' perceived use of AI-driven infrastructure and perceived administrative effectiveness in public secondary schools in Anambra State. This goes to show that principals' use of AI-driven infrastructure is critical to their administrative effectiveness. The more the routine tasks of principals are enhanced with their use AI-driven automation, the more their administratively effectiveness. Administrative effectiveness is enhanced with the use of AI-driven infrastructure. The finding of the current study is in tandem with that of Ughenu *et al.* (2025) that AI-powered sensors and monitoring systems can be utilized to optimize facilities management, including maintenance scheduling, energy consumption and space utilization. This is to the extent that AI-powered smart grids reduce operational costs while promoting administrative effectiveness. The finding of the current study is further in agreement with

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Purbiyanti *et al.* (2024) who noted that AI-driven systems in secondary schools monitor energy utilization and suggest conservation strategies.

Conclusion

Apparently, the use of AI-powered system is the way to go for principals to be administratively effective in line with global trend. Thus, it was concluded that principals' perceived use of AI-powered system has a positive relationship with their perceived administrative effectiveness in Anambra State.

Recommendations

In line with the findings, the following recommendations were made:

1. Principals should endeavor to use AI-powered analytics to enhance their administrative effectiveness.
2. Ministry of Education should organize seminars and workshops for principals on the need to improve on their use of AI-driven infrastructure for administrative effectiveness.
3. The government can support the introduction of AI-powered infrastructures in public secondary schools in Anambra State to enhance principals' administrative effectiveness.

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