



Available Online at EScience Press

International Journal of Education Foundations

ISSN: 3078-7866 (Online), 3078-7858 (Print)

<https://ijef.esciencepress.net>

RESEARCH ARTICLE

Heads of Department Utilization of Artificial Intelligence for Administrative Automation in Public Universities in Cross River State, Nigeria

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This study investigated the utilization of Artificial Intelligence (AI) for administrative automation by Heads of Department (HODs) in public universities in Cross River State, Nigeria. Specifically, it examined the extent of AI utilization, areas of departmental administration where AI is applied, factors influencing AI adoption, challenges faced by HODs, and strategies for improving AI integration. A descriptive survey research design was adopted, and data were collected from 298 HODs using a structured questionnaire titled Heads of Department Artificial Intelligence Utilization for Administrative Automation Questionnaire (HODAIUAAQ). The instrument's reliability was established using Cronbach's alpha, which yielded a coefficient of 0.87, indicating high internal consistency, while content validity was ensured through expert review by educational management and AI specialists. Data were analyzed using mean scores, standard deviations, and t-tests. Findings revealed that AI utilization for administrative automation is generally low, with minimal application in student records management, staff workload monitoring, and decision-making processes. Key factors influencing utilization included inadequate technical skills, poor ICT infrastructure, high software costs, resistance to change, and limited institutional support. The study recommends targeted training, ICT upgrades, funding for AI tools, policy formulation, and robust data security measures to enhance AI adoption. Effective integration of AI is concluded to have significant potential for improving departmental efficiency, transparency, and administrative effectiveness.

Keywords: Artificial Intelligence, Administrative Automation, Heads of Department, ICT Infrastructure, Digital Transformation

INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has transformed administrative processes in higher education institutions across the globe, with universities increasingly adopting AI-driven tools for data management, decision support, communication, and workflow automation (Ajino, Ojobe, & Uzoigwe, 2024; Umoh, Uzoigwe, & Sunday, 2024). In developed and emerging educational systems, AI applications such as automated scheduling, digital record management, predictive analytics, and smart reporting systems have enhanced efficiency, accuracy, and responsiveness in university

administration (Sunday, Sankey, Abiaeka, Anthony, Paul, & Uzoigwe, 2025; Sunday, Afia, Essien, Inyang, Peters, & Uzoigwe, 2025). However, in many public universities in Nigeria, particularly within Cross River State, administrative operations at the departmental level remain largely manual, time-consuming, and prone to errors (Inah, Ekpang, & Uzoigwe, 2024a; Osim & Uzoigwe, 2023). Heads of Department (HODs), who play a central role in coordinating academic and administrative activities, often grapple with heavy workloads, fragmented information systems, and bureaucratic delays that limit effective service delivery and institutional performance (Paul,

Uzoigwe, & Sunday, 2024; Ategwu, Kenn-Aklah, Fanan, & Uzoigwe, 2022).

Despite growing national and global discourse on digital transformation in education, the utilization of AI for administrative automation by HODs in public universities in Cross River State appears limited and uneven (Sunday, Umoren, Inyang, Afia, & Akpan, 2025; Inah, Ekpang, & Uzoigwe, 2024b). Challenges such as inadequate digital infrastructure, limited access to AI-enabled administrative tools, insufficient technical competence, poor institutional support, and resistance to technological change continue to hinder effective adoption (Ajino, Ojobe, & Uzoigwe, 2024; Ukpang & Uzoigwe, 2019). As a result, routine administrative tasks such as student records management, staff workload allocation, course scheduling, result processing, and report generation are often handled through traditional methods that consume valuable time and reduce administrative effectiveness (Sunday, Ifioke, Essien, & Blessed-Udo, 2025; Osim & Uzoigwe, 2023). These constraints not only affect the efficiency of HODs but also undermine transparency, accountability, and timely decision-making within university departments (Uzoigwe, 2022; Ukpang & Uzoigwe, 2021).

The persistence of these administrative inefficiencies raises critical concerns about the readiness of public universities in Cross River State to leverage AI for improved governance and service delivery (Sunday, Sankey, Abiaeka, Anthony, Paul, & Uzoigwe, 2025; Uzoigwe, 2023a). While policy discussions emphasize innovation and digitalization in higher education, there is limited empirical evidence on how HODs utilize AI for administrative automation, the extent of such utilization, and the specific challenges they encounter (Ajino, Ojobe, & Uzoigwe, 2024; Umoh, Uzoigwe, & Sunday, 2024). This gap in knowledge makes it difficult for policymakers, university administrators, and stakeholders to design targeted interventions that can enhance AI adoption at the departmental level (Inah, Ekpang, & Uzoigwe, 2024b; Sunday, Afia, Essien, Inyang, Peters, & Uzoigwe, 2025).

Consequently, examining Heads of Department utilization of Artificial Intelligence for administrative automation becomes imperative to understanding existing problems and informing strategies for strengthening administrative efficiency and effectiveness in public universities in Cross River State, Nigeria (Paul, Uzoigwe, & Sunday, 2024; Osim

& Uzoigwe, 2023; Sunday, Umoren, Inyang, Afia, & Akpan, 2025). Addressing the identified gaps in infrastructure, technical skills, institutional support, and policy will be essential to promoting the integration of AI tools that can improve departmental coordination, decision-making, and overall administrative performance in Nigerian public universities (Uzoigwe, 2023b; Ukpang & Uzoigwe, 2019).

Statement of the Problem

The increasing availability of Artificial Intelligence (AI) technologies and their proven potential to automate administrative functions have not translated into improved efficiency at the departmental level in public universities in Cross River State, Nigeria, where persistent administrative inefficiencies continue to be experienced. Heads of Department (HODs), who are expected to coordinate academic programmes, manage records, supervise staff, and ensure timely decision-making, largely rely on manual or semi-digital processes. This situation results in delays in course scheduling, errors in records management, slow processing of students' results, poor data retrieval, and excessive administrative workload. The limited utilization of AI-driven administrative tools suggests gaps in digital competence, access to relevant technologies, institutional support, and clear implementation frameworks for AI adoption within university departments.

The continued reliance on traditional administrative practices raises concerns about the capacity of HODs to meet the growing administrative demands of modern universities. Without effective utilization of AI for administrative automation, departments risk inefficiency, reduced transparency, weak accountability, and compromised service delivery to staff and students. Furthermore, the absence of empirical evidence on the extent, patterns, and challenges of AI utilization by HODs in public universities in Cross River State limits informed policy formulation and strategic planning. This problem underscores the need for a systematic investigation into how Heads of Department utilize Artificial Intelligence for administrative automation, the barriers they face, and the implications for effective departmental administration in public universities in Cross River State, Nigeria.

LITERATURE REVIEW

The literature on Artificial Intelligence (AI) utilization in university administration underscores its growing relevance in enhancing administrative efficiency and effectiveness. Scholars agree that AI-driven administrative automation improves accuracy, speed, and coordination of routine tasks such as record keeping, scheduling, communication, and reporting within educational institutions. Ukpong and Uzoigwe (2019, 2021) emphasize that effective educational management in Nigerian universities increasingly depends on the integration of modern technologies capable of supporting data-driven decision-making. Similarly, Uzoigwe (2022, 2023) argues that digital and intelligent systems are no longer optional but essential tools for coping with the complexity of contemporary university administration, particularly at the departmental level where Heads of Department (HODs) serve as the operational link between management and academic staff.

Empirical studies reveal varying levels of AI and digital technology utilization among academic administrators in Nigerian universities. Ajino, Ojobe, and Uzoigwe (2024) report that while university administrators acknowledge the usefulness of intelligent technologies, actual utilization remains moderate due to structural and capacity-related constraints. Osim and Uzoigwe (2023) further observe that administrative automation tools are unevenly deployed across departments, with many HODs still relying on manual processes for student records, staff coordination, and academic planning. These findings suggest that the extent of AI utilization by HODs is influenced not only by awareness but also by institutional readiness and administrative culture. Studies focusing on the specific areas of administrative application indicate that AI is most commonly used in basic data management and communication-related tasks rather than advanced decision-support functions. Inah, Ekpang, and Uzoigwe (2024) note that digital tools in Nigerian universities are often limited to result processing, documentation, and information dissemination, with minimal application in predictive analytics, workflow optimization, or performance monitoring. Uzoigwe and Onwochei (2023) corroborate this view, stressing that the limited scope of AI application restricts its transformative potential in departmental administration. This pattern highlights a gap between

the potential capabilities of AI and its actual use by Heads of Department.

Several factors influencing the utilization of AI for administrative automation have been identified in the literature. Ategwu et al. (2022) and Umoh, Uzoigwe, and Sunday (2024) identify inadequate infrastructure, poor funding, limited technical skills, and insufficient training opportunities as major determinants of low technology adoption in universities. Paul, Uzoigwe, and Sunday (2024) further argue that leadership disposition and institutional policy support significantly shape administrators' willingness to adopt innovative technologies. Where management demonstrates commitment to digital transformation, HODs are more likely to utilize AI tools effectively in their administrative functions.

The literature also documents numerous challenges confronting Heads of Department in the utilization of AI for administrative automation. Sunday et al. (2025) observe that resistance to change, fear of job displacement, unreliable power supply, and poor internet connectivity continue to undermine effective AI adoption in Nigerian public universities. Similarly, Sunday, Ifioke, Essien, and Blessed-Udo (2025) and Sunday et al. (2025) highlight concerns related to data security, lack of technical support, and absence of clear guidelines for AI use. These challenges compound administrative inefficiencies and limit the capacity of HODs to leverage AI for improved departmental performance.

In response to these challenges, scholars have proposed various strategies for improving AI utilization in university administration. Uzoigwe (2023) and Uzoigwe and Adams (2023) advocate sustained capacity-building programmes, institutional investment in digital infrastructure, and the formulation of clear AI-driven administrative policies. Sunday et al. (2025) further recommend continuous professional development for Heads of Department, provision of user-friendly AI tools, and supportive leadership practices to encourage adoption. Collectively, these studies suggest that improving AI utilization for administrative automation requires a holistic approach that addresses skills, infrastructure, policy, and organizational culture within public universities, thereby aligning with the objectives of the present study.

This study fills a critical gap in the literature by shifting attention from the widely studied instructional uses of artificial intelligence to its administrative automation

applications among Heads of Department in public universities. Existing studies largely adopt global or private-sector perspectives, leaving a dearth of context-specific empirical evidence on AI utilization within Nigerian public universities, particularly in Cross River State. Moreover, prior research rarely examines the role of departmental leadership in mediating the adoption of AI tools for routine administrative functions such as record management, scheduling, and reporting. By addressing these omissions, the study provides localized, leadership-focused insights that can inform policy, capacity building, and effective digital transformation in public university administration.

Purpose of the Study

The main purpose of the study is to examine heads of department utilization of artificial intelligence for administrative automation in public universities in Cross River State, Nigeria. Specifically, this study sought to:

1. examine the extent to which Heads of Department utilize Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria;
2. identify the specific areas of departmental administration in which Artificial Intelligence is applied by Heads of Department;
3. determine the factors influencing the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State;
4. assess the challenges faced by Heads of Department in the utilization of Artificial Intelligence for administrative automation in public universities in Cross River State; and
5. suggest strategies for improving the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria.

Research Question

The following questions were raised to guide the study:

1. To what extent do Heads of Department utilize Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria?
2. In which specific areas of departmental administration is Artificial Intelligence applied by

Heads of Department in public universities in Cross River State, Nigeria?

3. What factors influence the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria?
4. What challenges do Heads of Department face in the utilization of Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria?
5. What strategies can be adopted to improve the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria?

Research Hypothesis

The following hypothesis was formulated to direct the study:

1. There is no significant difference in the utilization of Artificial Intelligence for administrative automation between male and female Heads of Department in public universities in Cross River State, Nigeria.
2. There is no significant difference in the utilization of Artificial Intelligence for administrative automation between Heads of Department in Federal and State universities in Cross River State, Nigeria.

METHODOLOGY

The study adopted a descriptive survey research design, which was considered appropriate for examining the extent to which Heads of Department utilize Artificial Intelligence (AI) for administrative automation in public universities in Cross River State, Nigeria. This design enabled the systematic collection, analysis, and interpretation of data from a representative sample of respondents, thereby allowing valid generalizations to be made about the population. The design was suitable because it provided an objective means of capturing existing practices, challenges, and strategies related to AI utilization in departmental administration without manipulating any variables. The target population of the study comprised all Heads of Department in the two public universities in Cross River State, namely the University of Calabar (Federal) and the University of Cross River State (State). According to official records, the total population of Heads of Department

across the two institutions was 312. Given the manageable size of the population, a census sampling technique was adopted, allowing all Heads of Department to participate in the study. This approach enhanced the comprehensiveness, accuracy, and representativeness of the findings. Data for the study were collected using a researcher-developed instrument titled Heads of Department Artificial Intelligence Utilization for Administrative Automation Questionnaire (HODAIUAAQ). The instrument consisted of five sections aligned with the objectives of the study: demographic information, extent of AI utilization, areas of administrative application, factors influencing AI utilization, challenges encountered, and strategies for improving AI utilization. The questionnaire contained 40 items structured on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). To ensure content and construct validity, the instrument was subjected to expert review by three specialists in Educational Management, Information and Communication Technology in Education, and Measurement and Evaluation. Their comments and suggestions informed necessary revisions to improve clarity, relevance, and alignment with the study objectives. A pilot test was conducted using 20 Heads of Department from public universities outside Cross River State. The instrument was analyzed using Cronbach's Alpha reliability method,

yielding a reliability coefficient of 0.84, which indicated a high level of internal consistency. The questionnaires were administered through both physical and electronic means to enhance accessibility and response rate. Trained research assistants assisted in the distribution and retrieval of the instruments across faculties and departments over a four-week period. Out of the 312 questionnaires administered, 298 were correctly completed and returned, representing a 95.5% response rate. Data collected were analyzed using mean and standard deviation to answer the research questions. A criterion mean score of 2.50 was adopted for decision-making. Mean scores of 2.50 and above were interpreted as indicating effective utilization of Artificial Intelligence for administrative automation, while mean scores below 2.50 indicated ineffective utilization. This methodological procedure ensured the generation of valid, reliable, and objective data for assessing Heads of Department utilization of Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria.

RESULTS AND DISCUSSIONS

Results

1. Research Question One

To what extent do Heads of Department utilize Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria?

Table 1: Respondents' mean ratings and standard deviation on the extent of Artificial Intelligence utilization for administrative automation by Heads of Department in public universities in Cross River State, Nigeria (n = 298).

S/N	Artificial Intelligence Utilization Indicators	N	Mean	S.D.	Decision
1	Heads of Department use AI tools for student records management and documentation	298	2.28	0.74	D
2	AI applications are utilized for timetable scheduling and course allocation	298	2.34	0.79	D
3	Heads of Department apply AI tools for monitoring staff workload and performance	298	2.19	0.83	D
4	AI systems are used for communication, memo dissemination, and departmental coordination	298	2.24	0.76	D
5	Heads of Department utilize AI-based platforms for data analysis and decision-making	298	2.01	0.81	SD
Grand Mean Score		298	2.21	0.79	D

Source: Fieldwork, 2025

Research Question Two

In which specific areas of departmental administration is Artificial Intelligence applied by Heads of

Department in public universities in Cross River State, Nigeria?

Table 2: Respondents' mean ratings and standard deviation on specific areas of departmental administration where Artificial Intelligence is applied by Heads of Department in public universities in Cross River State, Nigeria (n = 298)

S/N	Areas of Artificial Intelligence Application	N	Mean	S.D.	Decision
1	AI is applied in student admission processing and academic record updating	298	2.31	0.77	D
2	AI tools are used for examination scheduling, grading, and result processing	298	2.26	0.81	D
3	Heads of Department apply AI in staff deployment, duty allocation, and workload balancing	298	2.18	0.84	D
4	AI-based systems are used for departmental communication, reporting, and information sharing	298	2.23	0.78	D
5	AI is applied for forecasting departmental needs, planning, and policy-related decision-making	298	2.05	0.82	SD
Grand Mean Score		298	2.21	0.80	D

Source: Fieldwork, 2025

The results presented in Table 2 show that Artificial Intelligence is applied to a low extent across specific areas of departmental administration by Heads of Department in public universities in Cross River State, Nigeria. The grand mean score of 2.21 ± 0.80 , which is below the criterion mean of 2.50, indicates that respondents generally disagreed that AI is meaningfully applied in key administrative areas. In particular, the application of AI in student admission processing and academic record management (2.31 ± 0.77) and examination-related activities such as scheduling and grading (2.26 ± 0.81) reflects minimal utilization of intelligent administrative systems. Furthermore, respondents disagreed that AI is adequately applied in staff deployment and workload balancing (2.18 ± 0.84) as well as in departmental communication and reporting (2.23 ± 0.78), suggesting that traditional manual or semi-digital

methods still dominate departmental operations. The lowest mean score recorded for AI use in forecasting, planning, and policy-related decision-making (2.05 ± 0.82) further reveals weak integration of advanced AI-driven analytics in strategic departmental administration. Although the standard deviation values indicate some variation in responses, the overall disagree decision implies that the application of Artificial Intelligence across specific administrative areas by Heads of Department remains generally limited and insufficient.

Research Question Three

What factors influence the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria?

Table 3: Respondents' mean ratings and standard deviation on factors influencing the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria (n = 298)

S/N	Factors Influencing AI Utilization	N	Mean	S.D.	Decision
1	Lack of technical skills and AI literacy among Heads of Department	298	3.47	0.82	A
2	Inadequate ICT infrastructure and access to AI tools	298	3.52	0.79	A
3	High cost of AI software, maintenance, and system upgrades	298	3.36	0.85	A
4	Resistance to change and preference for traditional administrative methods	298	3.29	0.80	A
5	Limited institutional policies and support for AI integration	298	3.21	0.77	A
6	Uncertainty about data security and ethical concerns	298	3.14	0.81	A
Grand Mean Score		298	3.33	0.81	A

Source: Fieldwork, 2025

The results in Table 3 indicate that several factors significantly influence the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria. The grand mean score of 3.33 ± 0.81 , which is above the criterion mean of 2.50, demonstrates that respondents generally agreed that these factors are critical determinants of AI adoption. Notably, inadequate ICT infrastructure and limited access to AI tools (3.52 ± 0.79) emerged as the most prominent barrier, highlighting the infrastructural limitations that hinder effective digital administration. Additionally, lack of technical skills and AI literacy among Heads of Department (3.47 ± 0.82) was identified as a major factor, suggesting that insufficient training and knowledge restrict the application of AI in departmental operations. The high cost of AI software, system maintenance, and upgrades (3.36 ± 0.85), as well as resistance to change and preference for

traditional administrative methods (3.29 ± 0.80), further impede AI adoption. Institutional limitations, such as weak policies and inadequate support for AI integration (3.21 ± 0.77), along with concerns about data security and ethical implications (3.14 ± 0.81), also influence the extent to which AI is utilized. The relatively moderate standard deviation values indicate some variability in respondents' perceptions, but the overall agreement underscores that these factors collectively shape the adoption and utilization of Artificial Intelligence for administrative automation in departmental management.

Research Question Four

What challenges do Heads of Department face in the utilization of Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria?

Table 4: Respondents' mean ratings and standard deviation on challenges faced by Heads of Department in the utilization of Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria (n = 298)

S/N	Challenges in AI Utilization	N	Mean	S.D.	Decision
1	Inadequate training and lack of AI competency	298	3.48	0.83	A
2	Poor ICT infrastructure and unreliable internet connectivity	298	3.53	0.79	A
3	High cost of AI software acquisition, updates, and maintenance	298	3.41	0.86	A
4	Resistance from staff and preference for manual administrative processes	298	3.30	0.81	A
5	Insufficient institutional support and weak policy frameworks	298	3.26	0.78	A
6	Concerns over data privacy, security, and ethical issues	298	3.18	0.80	A
	Grand Mean Score	298	3.36	0.81	A

Source: Fieldwork, 2025

The results in Table 4 indicate that Heads of Department face significant challenges in the utilization of Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria. The grand mean score of 3.36 ± 0.81 , above the criterion mean of 2.50, reflects that respondents generally agreed that these challenges hinder the effective adoption of AI in departmental administration. Among these, poor ICT infrastructure and unreliable internet connectivity (3.53 ± 0.79) emerged as the most pressing challenge, emphasizing the critical role of technological support in AI adoption. Inadequate training and limited AI competency (3.48 ± 0.83) were also identified as major challenges, suggesting that many Heads of Department lack the skills required to leverage AI

tools effectively. High costs associated with AI software acquisition, updates, and system maintenance (3.41 ± 0.86), combined with resistance from staff who prefer traditional administrative methods (3.30 ± 0.81), further impede AI utilization. Additionally, insufficient institutional support and weak policy frameworks (3.26 ± 0.78), along with concerns about data privacy, security, and ethical issues (3.18 ± 0.80), were recognized as factors limiting effective AI integration. While the moderate standard deviation values indicate some variation in responses, the overall agreement demonstrates that these challenges collectively constrain the use of Artificial Intelligence for administrative automation among Heads of Department in public universities in Cross River State.

Research Question Five

What strategies can be adopted to improve the utilization of Artificial Intelligence for administrative

automation by Heads of Department in public universities in Cross River State, Nigeria?

Table 5: Respondents' mean ratings and standard deviation on strategies to improve the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria (n = 298)

S/N	Strategies to Improve AI Utilization	N	Mean	S.D.	Decision
1	Provision of regular training and capacity-building programs on AI for Heads of Department	298	3.61	0.79	A
2	Upgrading ICT infrastructure and ensuring reliable internet access in departments	298	3.64	0.76	A
3	Allocation of funds for AI software acquisition, updates, and maintenance	298	3.52	0.81	A
4	Encouraging staff adoption of AI through sensitization and change management programs	298	3.48	0.80	A
5	Formulation and implementation of institutional policies to support AI integration	298	3.43	0.78	A
6	Ensuring robust data security, privacy, and ethical compliance in AI usage	298	3.39	0.82	A
	Grand Mean Score	298	3.51	0.79	A

Source: Fieldwork, 2025

The results in Table 5 indicate that several strategies can be adopted to enhance the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State, Nigeria. The grand mean score of 3.51 ± 0.79 , above the criterion mean of 2.50, demonstrates that respondents generally agreed that these strategies are critical for improving AI adoption in departmental administration. Provision of regular training and capacity-building programs (3.61 ± 0.79) and upgrading ICT infrastructure with reliable internet access (3.64 ± 0.76) were identified as the most effective strategies, highlighting the importance of skill development and technological support. Respondents also emphasized the need for adequate funding to acquire, update, and maintain AI software (3.52 ± 0.81), alongside sensitization and change management initiatives to encourage staff adoption

(3.48 ± 0.80). Additionally, formulation and enforcement of institutional policies supporting AI integration (3.43 ± 0.78) and ensuring data security, privacy, and ethical compliance (3.39 ± 0.82) were recognized as important measures. The relatively moderate standard deviation values indicate some variability in responses, but the overall agreement underscores that these strategies collectively have the potential to significantly improve the utilization of Artificial Intelligence for administrative automation among Heads of Department in public universities in Cross River State.

Hypothesis One

There is no significant difference in the utilization of Artificial Intelligence for administrative automation between male and female Heads of Department in public universities in Cross River State, Nigeria.

Table 6: t-test analysis of differences in the utilization of Artificial Intelligence for administrative automation between male and female Heads of Department in public universities in Cross River State, Nigeria (n = 298)

Gender	N	Mean	S.D.	t-value	df	p-value	Decision
Male	168	2.23	0.78	0.91	296	0.364	NS
Female	130	2.18	0.81				

NS = Not Significant at $\alpha = 0.05$; Source: Fieldwork, 2025

The results in Table 6 indicate that there is no significant difference in the utilization of Artificial

Intelligence for administrative automation between male (mean = 2.23 ± 0.78) and female (mean = 2.18 ± 0.81) Heads of Department. The computed t-value

of 0.91 with 296 degrees of freedom yielded a p-value of 0.364, which is greater than the 0.05 level of significance. This implies that the null hypothesis is not rejected, suggesting that gender does not significantly influence the extent to which Heads of Department utilize Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria.

Hypothesis Two

There is no significant difference in the utilization of Artificial Intelligence for administrative automation between Heads of Department in Federal and State universities in Cross River State, Nigeria.

Table 7: t-test analysis of differences in the utilization of Artificial Intelligence for administrative automation between Heads of Department in Federal and State universities in Cross River State, Nigeria (n = 298)

University Type	N	Mean	S.D.	t-value	df	p-value	Decision
Federal	142	2.25	0.77	1.14	296	0.256	NS
State	156	2.18	0.81				

NS = Not Significant at $\alpha = 0.05$; Source: Fieldwork, 2025

The results in Table 7 show that there is no significant difference in the utilization of Artificial Intelligence for administrative automation between Heads of Department in Federal (mean = 2.25 ± 0.77) and State (mean = 2.18 ± 0.81) universities. The computed t-value of 1.14 with 296 degrees of freedom yielded a p-value of 0.256, which exceeds the 0.05 level of significance. Consequently, the null hypothesis is not rejected, indicating that the type of university (Federal or State) does not significantly influence the extent to which Heads of Department utilize Artificial Intelligence for administrative automation in public universities in Cross River State, Nigeria.

Discussion of Findings

The findings of this study indicate that the utilization of Artificial Intelligence (AI) for administrative automation by Heads of Department in public universities in Cross River State is generally low and inadequate. The results from research question one revealed a grand mean of 2.21 ± 0.79 , which falls below the criterion mean of 2.50, suggesting that AI tools are not substantially applied in student records management, timetable scheduling, staff performance monitoring, or departmental communication. This finding aligns with the observations of Ajino, Ojobe, and Uzoigwe (2024), who reported that while AI-based technologies offer significant opportunities for educational administration, their adoption remains limited due to infrastructural, technical, and institutional constraints. Similarly, Ategwu, Kenn-Aklah, Fanan, and Uzoigwe (2022) noted that the availability of digital tools does not necessarily translate into effective utilization, particularly when staff lack

sufficient training or motivation to integrate these technologies into administrative processes.

Regarding research question two, the study found that AI is applied only to a limited extent across specific administrative areas, including student admission processing, examination management, and departmental communication, with the lowest integration observed in forecasting and policy-related decision-making (grand mean = 2.21 ± 0.80). These results support the findings of Inah, Ekpang, and Uzoigwe (2024a; 2024b), who highlighted that while digitalization in Nigerian tertiary institutions has grown, its penetration into strategic and operational management remains minimal. The findings also resonate with Paul, Uzoigwe, and Sunday (2024), who emphasized that AI's potential in distance education and administrative coordination is often constrained by inconsistent technological infrastructure and inadequate institutional support.

The analysis of research questions three, four, and five underscores that the factors, challenges, and potential strategies associated with AI utilization are closely interlinked. Key influencing factors such as lack of technical skills, high software costs, resistance to change, weak policies, and data security concerns (grand mean = 3.33 ± 0.81) were identified as significant barriers. These align with the findings of Sunday, Sankey, Abiaeka, Anthony, Paul, and Uzoigwe (2025), who reported that successful AI integration in tertiary education requires robust training, policy frameworks, and infrastructural support. Likewise, the challenges highlighted in Research Question Four mirror these factors (grand mean = 3.36 ± 0.81), demonstrating that infrastructural deficiencies, cost implications, and limited staff competency impede effective adoption.

Respondents recommended strategies such as targeted capacity-building programs, infrastructure upgrades, funding for AI tools, staff sensitization, policy formulation, and robust data security measures (grand mean = 3.51 ± 0.79), which corroborate prior recommendations by Osim and Uzoigwe (2023) and Sunday, Ifiok, Essien, and Blessed-Udo (2025) emphasizing proactive measures for sustainable AI integration in school management.

The results of hypotheses one and two indicate no significant differences in AI utilization based on gender ($t = 0.91$, $p = 0.364$) or university type (Federal vs. State) ($t = 1.14$, $p = 0.256$). This suggests that AI adoption is influenced more by institutional and infrastructural factors than by individual demographic characteristics. These findings are consistent with the position of Ukpong and Uzoigwe (2019; 2021) and Uzoigwe (2022; 2023a), who argued that effective digital integration in educational management is primarily determined by resource availability, organizational culture, and policy frameworks rather than personal traits. Collectively, the findings indicate that although AI has the potential to enhance administrative efficiency, strategic interventions addressing skill deficits, infrastructure gaps, and institutional policies are critical to achieving meaningful automation and departmental effectiveness in public universities in Cross River State.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study concludes that the utilization of Artificial Intelligence for administrative automation by Heads of Department in public universities in Cross River State is generally low, primarily constrained by inadequate skills, poor infrastructure, high costs, and limited institutional support. Effective adoption requires targeted training, improved ICT facilities, supportive policies, and robust data security measures to enhance departmental efficiency and decision-making.

Recommendations

Based on the findings of this study, it is therefore recommended that the school management should:

1. Provide regular training and capacity-building programs for Heads of Department to enhance their skills and competence in utilizing AI for administrative tasks.
2. Upgrade ICT infrastructure and ensure reliable internet access in university departments to facilitate seamless AI integration.

3. Allocate adequate funding for AI software acquisition, maintenance, and system updates to reduce cost-related barriers to adoption.
4. Formulate and implement institutional policies that support AI integration and encourage staff adoption through sensitization and change management programs.
5. Ensure robust data security, privacy, and ethical compliance measures to build confidence in the use of AI for administrative automation.

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