

ARTIFICIAL INTELLIGENCE (AI)-POWERED ADMINISTRATIVE CHATBOTS AS DETERMINANTS OF SERVICE DELIVERY IN PUBLIC SECONDARY SCHOOLS IN BENUE STATE, NIGERIA

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Abstract

*This study investigated Artificial Intelligence (AI)-powered administrative chatbots as determinants of service delivery in public secondary schools in Benue State, Nigeria. The study was guided by two research questions and two hypotheses were formulated and tested. The study employed correlational research design. The population was 2,472 teachers in 319 **public secondary schools** in Benue State, Nigeria. The sample for the study was 371 teachers in 48 public secondary schools representing 18% of the population. The sample was selected using multi-stage sampling procedure. The instrument for data collection was researcher-structured questionnaires titled “AI-Powered Administrative Chatbots Questionnaire (AIPACQ)” and “Service Delivery Questionnaire (SDQ).” The AIPACQ was structured in two clusters: Cluster A and B with five items each on admission chatbots and fee payment chatbots. The SDQ contains 10 items which sought opinions on service delivery in public secondary schools. Two experts from Fr. Adasu University, Makurdi validated the instrument. It was trial tested on 30 teachers using Cronbach Alpha. Reliability co-efficient of 0.89 was found. It was also structured on a four-point rating scale with response modes of Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. The data collected were analyzed using the Pearson Product Moment Correlation (PPMC) to answer the research questions and test the hypotheses at 0.05 level of significance. The findings of the study showed that there was a very strong significant positive relationship between admission chatbots and fee payment chatbots with service delivery in public secondary schools. The study concluded that AI-powered administrative chatbots has potentials to improve service delivery in public secondary schools. It was therefore recommended that public secondary schools should integrate AI-powered administrative chatbots such as admission chatbots and fee payment chatbots in order to enhance service delivery in public secondary schools in Nigeria.*

Keywords: Artificial Intelligence, administrative chatbots, admission chatbots and fee payment chatbots

Introduction

The demand for service delivery in secondary schools cannot be overemphasized probably because efficient service delivery enhances teachers’ productivity, fosters a conducive learning environment and strengthens trust among stakeholders such as parents, communities and government, thereby contributing to the overall effectiveness and sustainability of the education system. However, many administrators seem to grapple with the challenge of service delivery in secondary

schools as it often manifests through inadequate funding, insufficient instructional resources, poor teacher motivation and weak administrative capacity, all of which hinder effective teaching and learning outcomes (Adebayo & Ojo, 2021). Similarly, some schools struggle with overcrowded classrooms, limited access to modern teaching materials, inadequate infrastructure, ineffective admission practices and fee payment which negatively affect both teachers' performance and students' achievement (Okeke & Eme, 2020). These issues may hinder effective service delivery especially in public secondary schools.

Service delivery in secondary schools refers to the systematic provision of educational services, resources, and support mechanisms aimed at ensuring effective teaching and learning, student development and overall school performance (Sharma & Singh, 2021). It encompasses the quality of instructional delivery, availability of qualified teachers, provision of instructional materials, maintenance of conducive learning environments, administrative efficiency, and student welfare services (Afolabi & Adesanya, 2022). Effective service delivery in secondary schools ensures that educational goals are achieved by meeting the academic, social and emotional needs of learners, while also fostering accountability, equity and continuous improvement within the school system.

The rapid diffusion of artificial intelligence (AI) into everyday institutional processes is reshaping how schools organize, communicate and deliver services. Among the most visible AI applications in education are AI-powered administrative chatbots conversational agents that automate routine tasks such as answering queries, scheduling meetings, guiding registration, and triaging problems (Okonkwo & Nwankwo, 2022). In secondary schools, where administrators balance heavy workloads, diverse stakeholder needs (students, parents, teachers, support staff), and limited resources, AI-powered administrative chatbots may help to streamline operations, reduce bottlenecks and improve the timeliness and consistency of service delivery.

AI-powered administrative chatbots differ from instructional AI tools in purpose and design: they focus on back-office and front-office workflows rather than pedagogy (Okonkwo & Nwankwo, 2022). Typical tasks include responding to frequently asked questions about enrollment, attendance, fees and schedules; initiating or tracking requests (e.g., permission slips, maintenance reports); issuing reminders; and routing more complex issues to the appropriate human staff. By handling repetitive, high-volume interactions 24/7, these chatbots can free administrators' time for tasks requiring professional judgment, while giving students and parents faster access to information outside normal office hours (Gupta & Chatterjee, 2023). Some of the AI-powered administrative chatbots commonly used in secondary schools especially in Benue State which may significantly relate with service delivery are admission chatbots and fee payment chatbots.

Admission chatbots are AI-powered conversational agents designed to assist prospective students and other stakeholders in navigating the admission process of educational institutions by providing instant responses to inquiries, guiding users through application procedures and enhancing communication efficiency (Adam et al., 2021). Admission chatbots leverage natural language processing (NLP) and machine learning to deliver personalized, real-time support, thereby improving user experience and reducing administrative workload for staff (Jain & Kumar, 2022). By simulating human-like interactions, admission chatbots serve as cost-effective digital

tools that streamline admission-related services, such as application status updates, eligibility checks and frequently asked questions, contributing to institutional effectiveness and student satisfaction (Sharma & Singh, 2021). The use of admission chatbots in secondary schools has become a strategic tool for improving service delivery, as they provide instant responses to inquiries, reduce administrative workload and enhance communication between schools and prospective students or parents (Okonkwo & Uzuegbunam, 2022). By automating routine tasks, chatbots can allow school administrators to focus on more complex issues, ultimately enhancing overall service quality and institutional effectiveness.

A fee payment chatbot is another AI-powered conversational system designed to facilitate, automate and manage financial transactions related to tuition or service fees in educational institutions and organizations (Okonkwo & Nwankwo, 2022). It uses natural language processing (NLP) to interact with users, provide real-time information on balances, generate payment reminders and guide students or clients through secure digital payment processes, thereby reducing administrative workload and enhancing convenience and transparency (Gupta & Chatterjee, 2023). Such chatbots are increasingly integrated into school portals and financial management systems to improve efficiency and user experience in fee collection (Okonkwo & Nwankwo, 2022). Fee payment chatbots provide parents and guardians with a convenient, real-time and transparent platform for financial transactions, thereby reducing administrative bottlenecks and improving efficiency in school administration (Gupta & Chatterjee, 2023). Studies have shown chatbots streamline service processes, enhance user satisfaction and improve organizational performance in educational contexts (Afolabi & Adesanya, 2022; Okoye & Umeh, 2023). Thus, the deployment of fee payment chatbots may improve service delivery through efficiency, accessibility and transparency in secondary schools. It is based on the above background that this study investigated the AI-powered administrative chatbots as determinants of service delivery in public secondary schools in Benue State, Nigeria.

Statement of the Problem

Service delivery in education is important because it ensures equitable access, quality teaching and effective utilization of resources to enhance learners' achievement and overall educational outcomes. In recent years, the integration of Artificial Intelligence (AI) into school administration has introduced new opportunities for improving service delivery in public secondary schools. AI-powered administrative chatbots, such as admission chatbots and fee payment chatbots, are designed to enhance efficiency by providing instant responses, reducing human workload, minimizing delays and ensuring timely access to critical information. However, public secondary schools in Benue State, Nigeria, the ineffective use of AI-powered administrative chatbots, such as admission and fee payment chatbots, has created significant challenges that hinder efficient service delivery. While these digital tools are designed to simplify processes, reduce administrative workload, and enhance communication between schools, students and parents, their poor deployment and underutilization often result in delays, misinformation, and frustration among stakeholders.

Many public secondary schools seem to lack technical expertise, reliable internet infrastructure and proper training required for effective chatbot use, leading to frequent system breakdowns, limited responsiveness and errors in handling queries

on admissions or fee transactions. This situation, instead of improving efficiency, the ineffective adoption of these technologies appears to undermine trust, prolongs manual intervention and reduces overall satisfaction with administrative services in public secondary schools in the state. It is against this rationale that this study investigated AI-powered administrative chatbots as determinants of service delivery in public secondary schools in Benue State, Nigeria.

Purpose of the Study

The purpose of the study was to investigate AI-powered administrative chatbots as determinants of service delivery in public secondary schools in Benue State, Nigeria. Specifically, the study sought to:

1. examine the relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria.
2. ascertain the relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Research Questions

The following research questions guided the study:

1. What is the relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria?
2. What is the relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria?

Hypotheses

The study formulated and tested the following hypotheses at 0.05 level of significance:

1. There is no significant relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria.
2. There is no significant relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Methodology

The design adopted for this study was the correlational research design. The population of the study comprised 2,472 teachers in 319 **public secondary schools** in Benue State, Nigeria (Benue State Ministry of Education Makurdi, 2025). The sample for the study was 371 teachers in 48 public secondary schools in Benue State, Nigeria representing 18% of the total population. The sample was selected using multi-stage sampling procedure. The instrument for data collection was researcher-structured questionnaires titled “AI-Powered Administrative Chatbots Questionnaire (AIPACQ)” and “Service Delivery Questionnaire (SDQ).” The AIPACQ was structured in two clusters: Cluster A and B with five items each on admission chatbots and fee payment chatbots. The SDQ contained 10 items which sought opinions on service delivery in public secondary schools. The questionnaires were validated by two experts in Fr. Adasu University, Makurdi. The instrument was trial tested on 30 teachers using Cronbach Alpha. Reliability co-efficient of 0.86 and 0.91 with a grand index of 0.89 was found. The questionnaires were structured on a four-point rating scale with response modes of Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D)

= 2 and Strongly Disagree (SD) = 1. The data collected were analyzed using the Pearson Product Moment Correlation (PPMC) to answer the research questions and test the hypotheses. The decision rule in answering the research questions was that the closer the calculated correlation coefficient (r) is to +1 or -1, the stronger the relationship between the variables. The strength of the correlation was interpreted using the guideline by Nworgu (2015): 0.00 – 0.19 = Very weak correlation, 0.20 – 0.39 = Weak correlation, 0.40 – 0.59 = Moderate correlation, 0.60 – 0.79 = Strong correlation, 0.80 – 1.00 = Very strong correlation. The decision rule for testing the hypotheses was that if the calculated p-value is less than or equal to 0.05 level of significance, the null hypothesis was rejected; otherwise, it was accepted.

Results

Research Question 1: What is the relationship between admission chatbots and service delivery in public secondary schools in Benue State Nigeria?

Table 1

Relationship between Admission Chatbots and Service Delivery in Public Secondary Schools in Benue State Nigeria

Variable	N	$\bar{X}$	SD	R	Decision
Admission Chatbots	371	2.87	1.11	0.81	Very Strong
Service Delivery in Public Secondary Schools	371	3.10	0.89		Positive Relationship

Table 1 shows that the mean value of admission chatbots was 2.87 slightly below that of service delivery in public secondary schools in Benue State, Nigeria which was 3.10; $r = 0.81$. This implies that there was a very strong positive relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Research Question 2: What is the relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria Nigeria?

Table 2: *Relationship between Fee Payment Chatbots and Service Delivery in Public Secondary Schools in Benue State, Nigeria*

Variable	N	$\bar{X}$	SD	R	Decision
Fee Payment Chatbots	371	2.83	1.07	0.92	Very Strong
Service Delivery in Public Secondary Schools	371	3.10	0.89		Positive Relationship

Source: Field Work 2025

Table 2 shows that the mean value of fee payment chatbots was 2.83 slightly below that of service delivery in public secondary schools in Benue State, Nigeria which was 3.10; $r = 0.92$. This implies that there was a very strong positive relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Hypothesis 1: There is no significant relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Table 3: *Test of Relationship between Admission Chatbots and Service Delivery in Public Secondary Schools in Benue State, Nigeria*

Variable	N	$\bar{X}$	SD	r	P	Decision
Admission Chatbots	371	2.87	1.11	0.81	0.000	Very Strong Significant
Service Delivery in Public Secondary Schools	371	3.10	0.89			Positive Relationship

Source: Field Work 2025

Table 3 shows that $r = 0.81$; $p < 0.05$. Since $p\text{-value} = (0.000)$ was less than 0.05, the hypothesis which states that there is no significant relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria was rejected. This implies that there was a very strong significant positive relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Hypothesis 2: There is no significant relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Table 4:
Test of Relationship Fee Payment Chatbots and Service Delivery in Public Secondary Schools in Benue State, Nigeria

Variable	N	$\bar{X}$	SD	R	P	Decision
Fee Payment Chatbots	371	2.83	1.07			
				0.92	0.000	Very Strong Significant Positive Relationship
Service Delivery in Public Secondary Schools	371	3.10	0.89			

Source: Field Work 2025

Table 4 reveals that $r = 0.92$; $p < 0.05$. Since $p\text{-value} = 0.000$ was less than 0.05, the hypothesis which state that there is no significant relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria was therefore, rejected. This implies that there was a very strong significant positive relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria.

Discussion of Findings

The first finding of the study showed that there was a very strong significant positive relationship between admission chatbots and service delivery in public secondary schools in Benue State, Nigeria. This finding agreed with Jain and Kumar (2022) who found that admission chatbots leverage natural language processing (NLP) and machine learning to deliver personalized, real-time support, thereby improving user experience and reducing administrative workload for staff. The finding is also in line with Sharma and Singh (2021) who maintain that by simulating human-like interactions, admission chatbots serve as cost-effective digital tools that streamline admission-related services, such as application status updates, eligibility checks and frequently asked questions, contributing to institutional effectiveness and student satisfaction. Furthermore, this finding aligned with Okonkwo and Uzuegbunam (2022) who established that the use of admission chatbots in secondary schools has become a strategic tool for improving service delivery, as they provide instant responses to inquiries, reduce administrative workload and enhance communication between schools and prospective students or parents. This finding demonstrated that

admission chatbots have positive significant relationship with service delivery in secondary schools.

The second finding also showed that there was a very strong significant positive relationship between fee payment chatbots and service delivery in public secondary schools in Benue State, Nigeria. This finding conformed to the opinion of Okwonkwo and Nwankwo (2022) that fee payment chatbots are increasingly integrated into school portals and financial management systems to improve efficiency and user experience in fee collection. The finding also agreed with Gupta and Chatterjee (2023) who found that fee payment chatbots provide parents and guardians with a convenient, real-time and transparent platform for financial transactions, thereby reducing administrative bottlenecks and improving efficiency in school administration. The finding further collaborate with Afolabi and Adesanya (2022) and Okoye and Umeh (2023) whose separate findings indicated that fee payment chatbots streamline service processes, enhance user satisfaction and improve organizational performance in educational contexts suggesting that fee payment chatbots have significant relationship with service delivery education.

Conclusion

Based on the findings of the study, it has been concluded that AI-powered administrative chatbots have potentials to improve service delivery in public secondary schools. Thus, there is a very strong significant positive relationship between AI-powered administrative chatbots and service delivery in public secondary schools in Benue State, Nigeria. This points to the fact that effective application of AI-powered administrative chatbots such as admission chatbots and fee payment chatbots lead to improved service delivery in public secondary schools for effective realization of the goals and objectives of public secondary schools.

Recommendations

In order to improve service delivery in public secondary schools through AI-powered chatbots, the following recommendations were made:

1. Public secondary schools should adopt admission chatbots to provide instant, 24/7 responses to prospective students and parents regarding admission requirements, entrance examinations, deadlines, and document submissions. This will reduce the workload of admission officers, minimize delays in responding to inquiries, and enhance transparency in the admission process.
2. Public secondary schools should implement fee payment chatbots integrated with secure digital payment platforms to assist parents in checking outstanding balances, generating receipts and making real-time payments. This innovation will streamline the fee payment process, reduce long queues in school bursary offices, and improve accountability in financial records.

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