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Utilizing Artificial Intelligence to Support Teacher Administration and Improve Education Quality

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ABSTRACT

This study examines the role of artificial intelligence (AI) in supporting teachers' learning administration and its implications for work efficiency and educational service quality in Karawang Regency. The research employs a qualitative literature review design, drawing data from national and international journals, academic books, conference proceedings, and relevant educational policy documents published over the last decade. Data analysis was conducted using thematic analysis, involving systematic literature selection, coding, categorisation, and theme development related to AI implementation, its impacts, and challenges in educational administration. The findings reveal that AI is utilised in various administrative activities, including grade processing, attendance management, electronic report card generation, academic documentation management, and real-time monitoring of student learning progress. The use of AI significantly improves teachers' work efficiency by reducing administrative workloads, minimising data entry errors, and enhancing the accuracy and transparency of academic information. Consequently, teachers are able to allocate more time and attention to instructional planning and classroom learning activities. Despite these benefits, several challenges persist, such as inadequate digital infrastructure, disparities in teachers' digital literacy, and concerns regarding student data security and privacy. Overall, the study concludes that AI integration in educational administration holds strong potential to improve educational service quality when supported.

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1. INTRODUCTION

The administrative workload borne by teachers continues to be an empirical issue that directly affects the quality of education, especially at the primary school level. In addition to their teaching responsibilities, teachers are also required to handle various administrative tasks, including

developing learning materials, completing student learning reports, documenting assessment results, and compiling school activity reports. When administrative demands become excessive, most of teachers' time and energy is diverted to non-instructional tasks, which in turn reduces their ability to focus on planning and providing meaningful learning experiences for students. A case study conducted in Karawang Regency shows that most of the teachers' administrative activities are still managed manually and in separate, unintegrated systems. Such practices cause administrative processes to be slow and inefficient, and increase the risk of late reporting. As a result, teachers face a heavier administrative burden that negatively impacts the quality of lesson preparation and overall classroom learning effectiveness (Acosta-Enriquez et al., 2025). Advances in Artificial Intelligence (AI) technology offer significant potential for addressing these challenges. AI can automate various tasks, manage large amounts of data, and generate recommendations that facilitate quick and accurate decision-making, including in the field of educational administration (Alfarwan, 2025). In the education sector, the implementation of AI is not limited to the creation of learning media or adaptive learning systems, but also promises to improve the efficiency of administrative processes, which have long been a major concern for teachers (Taufik, Sidoarjo, Rindaningsih, & Sidoarjo, 2024). Therefore, the integration of AI into learning administration is expected to ease the workload of teachers and support the improvement of sustainable education quality.

At the elementary and secondary school levels, teachers have a dual role as educators and administrators. Administrative tasks such as recording grades, compiling learning outcome reports, and documenting student progress often require significant time and effort. This situation often reduces teachers' ability to focus on creating innovative, student-centered learning experiences (Akgun & Greenhow, 2022). Therefore, the integration of artificial intelligence (AI) to support teacher administration is considered a strategic approach to reducing the administrative burden, allowing teachers to carry out their pedagogical roles more effectively (Bunkar, Chauhan, Verma, & Sirilakshmi, 2024). Karawang Regency is among the regions with a high number of primary and secondary schools, which makes educational administration quite challenging. Obstacles such as limited technological infrastructure, uneven internet access, and low digital literacy among teachers remain pressing issues that hinder the effective use of educational technology (Braun & Clarke, 2021). Teachers' digital literacy remains an empirical issue that has a direct impact on the effectiveness of educational technology use and the quality of learning in primary schools (Slamet, Fitria, & Laventia, 2025). Several studies show that teachers' limited competence in understanding and operating digital technology causes technology to be used more for basic administrative purposes rather than to support innovative and meaningful learning experiences for students. This condition shows that inadequate digital skills among teachers cause technological tools to be used only at a basic administrative level and fail to contribute significantly to improving the quality of learning (Bunkar et al., 2024). This condition is further supported by preliminary observations conducted in several primary schools in Karawang Regency, which show that teachers still face challenges in managing digital-based learning administration, including processing grades, summarising assessment results, and compiling electronic report cards. As a result of these constraints, many administrative activities are still carried out manually or semi-digitally, making the process slow and inefficient, as well as prone to delays in reporting (Dehen, Harari, & Aharony, 2026).

International research (X. Chen, Xie, Zou, & Hwang, 2020) integrating artificial intelligence (AI) into education administration can improve teacher efficiency, increase data accuracy, and enhance transparency in reporting student learning outcomes. In addition, the application of this technology encourages data-driven decision-making practices that can strengthen education governance at both the school and institutional levels. However, the implementation of AI also faces obstacles, including the readiness of digital infrastructure, educators' technological literacy, and data ethics and privacy issues that require comprehensive attention (L. Chen, Chen, & Lin, 2020). An international study conducted by Zawacki-Richter et al. (2021) shows that the integration of artificial intelligence (AI) into educational administration plays an important role in improving teacher efficiency, particularly in

managing academic data, processing grades, and producing more accurate and transparent learning outcome reports. These findings are supported by (L. Chen et al., 2020), who emphasise that the application of AI in education management facilitates data-driven decision-making, thereby promoting a more systematic and objective process in education planning and evaluation. Meanwhile, Smutny and Schreiberova (2020) demonstrate the significant potential of AI in automating various school administrative tasks, including student data management and academic reporting; however, they also observe that the adoption of this technology is still largely concentrated in higher education and has not been widely implemented at the primary school level. Furthermore, a study by Akgun and Greenhow (2022) on educators' readiness for AI technology reveals that low levels of technological literacy and a lack of conceptual understanding of AI are major barriers to its adoption in schools. Chen et al. (2020) also emphasise that the application of AI in education raises ethical issues, particularly regarding data privacy, academic information security, and transparency in the use of algorithms, all of which require a clear regulatory framework and effective oversight. Although there is a growing body of research discussing the potential, benefits, and challenges of AI implementation in educational administration, most existing studies are still concentrated in higher education settings or are largely conceptual and normative in nature. To date, empirical studies that specifically investigate the use of AI in learning administration at the primary school level are still limited, especially in the context of education in Indonesia (TR, 2025). Furthermore, there is a lack of research that directly links the application of AI in teachers' administrative work with improvements in teacher effectiveness and classroom learning quality. Therefore, this study attempts to address this gap by investigating the application of AI in learning administration at the primary school level and examining its implications for teacher work efficiency and learning service quality in a more comprehensive manner.

Based on the identified problems and research gaps, this study was designed to examine the role of artificial intelligence (AI) in supporting educational administration in Karawang Regency. Specifically, this study aims to (1) describe various forms of AI implementation in the educational administration process at the primary and secondary school levels, (2) assess the impact of AI utilisation on teacher work efficiency and school administration management, and (3) analyse its implications for improving the quality of educational services and learning. The findings of this study are expected to contribute theoretically to the advancement of studies related to AI in educational administration, as well as provide practical insights for policymakers and education practitioners in developing effective, efficient, and sustainable digital technology solutions in the context of Karawang Regency.

2. METHODS

This study adopts a qualitative approach with a literature review design to comprehensively examine the use of artificial intelligence (AI) in supporting administrative tasks performed by teachers at primary and secondary education levels. This design was chosen because it allows researchers to systematically identify, compare, and synthesise conceptual frameworks and empirical evidence from various relevant scientific sources, without the need for direct data collection in the field (ÖZDEN, 2024) (Calderon Martinez et al., 2025). The research data sources were reputable national and international journal articles, academic books, conference proceedings, and education policy documents published in the last ten years. The literature was selected purposively based on topic relevance, source credibility, and relevance to the issue of AI implementation in education administration, particularly in relation to teacher work efficiency, education governance, and the quality of administrative services (Lim, 2025).

Data analysis utilised a thematic analysis approach, which began with the identification and selection of relevant literature, followed by critical examination to extract key concepts, findings, and arguments related to the application of AI in teacher administration. Next, relevant information is coded and organised into thematic categories, from which the main themes reflecting the benefits,

challenges, and implications of using AI in educational settings are derived (Willie, 2025). To maintain the validity and credibility of the study results, this research applies a source triangulation strategy, which involves comparing findings from various types of literature and different theoretical perspectives (Ahmed et al., 2025). In addition, the consistency of the analysis is maintained through systematic recording of the literature search and analysis process (audit trail), so that the research results have transparency, traceability, and a strong theoretical basis.

3. FINDINGS AND DISCUSSION

Findings

3.1 Implementation of Artificial Intelligence (AI) in Teacher Administration

The findings show that primary and secondary schools in Karawang Regency involved in this study have incorporated artificial intelligence (AI) into their teacher administration systems through AI-based digital administration applications. This system is routinely used in teachers' daily administrative tasks, particularly for processing grades, recording student attendance, preparing electronic report cards, and managing academic documentation. Observational data show that teachers are responsible for entering basic information, after which the AI system automatically processes the data into academic reports and dashboard formats that can be accessed by teachers, school principals, and education officials at the regency level. The adoption of AI has replaced previous manual and semi-manual procedures that required repetitive work and were prone to data entry and recording errors.

Table 1. Implementation of AI in Teacher Administration

No	Types of Administration	Forms of AI Implementation	Field Practice
1	Value Processing	The AI system performs automatic calculations and summaries.	Teachers input grades, the system generates final summaries
2	Student Attendance	AI-based digital attendance recording	Direct attendance is stored in the system
3	Electronic Report Card	Automatic report generation	Reports can be downloaded without manual compilation.
4	Academic Documentation	Centralised data storage	Documents are easy to trace and update
5	Academic Monitoring	Dashboard real-time	The head teacher monitors the students' progress.

Based on Table 1, the application of artificial intelligence (AI) in teacher administration covers various integrated academic management components. AI systems are used to automate grade processing, student attendance recording, electronic report card preparation, academic document management, and real-time academic progress monitoring. In its implementation, teachers serve as providers of basic data, while AI-based systems automatically process, calculate, and present information in the form of comprehensive reports and dashboards. The use of AI in grade processing and electronic report card generation allows teachers to obtain quick and accurate summaries without the need for repetitive manual calculations. The integrated digital attendance system also ensures that student data is recorded and stored systematically. In addition, centralised storage of academic information facilitates document search, updating, and management. The availability of real-time dashboard-based academic monitoring allows school principals to continuously monitor student

learning progress, thereby supporting a more effective and data-driven academic decision-making and evaluation process.

3.2 The Impact of AI Implementation on Education Quality

The impact of AI implementation on education quality was identified through several operational indicators derived from interviews and observations, including teacher work efficiency, administrative data accuracy, academic information transparency, and increased teacher focus on learning activities. The interview results showed that teachers experienced a substantial reduction in the time needed to complete administrative tasks compared to the period before AI adoption. In addition, data entry errors that previously occurred frequently have been significantly reduced, as the AI system performs automatic validation. Data transparency has also increased, as academic information can be accessed in real time by schools and education authorities, thereby supporting a more effective monitoring and evaluation process.

Table 2. Impact of AI Implementation on Education Quality

No	Education Quality Indicators	Empirical Findings	Visible Changes
1	Teacher Work Efficiency	Reduced administrative time	Teachers focus more on teaching
2	Accuracy of Academic Data	Minimal recording errors	More consistent and valid data
3	Transparency of Information	Real-time data access	More effective supervision
4	Focus of Learning	Reduced administrative burden	Improved lesson planning
5	School Governance	Integrated data	More systematic academic evaluation

As shown in Table 2, the application of artificial intelligence (AI) has had a clear positive effect on improving the quality of education, as demonstrated by several operational measures. One of the most notable impacts is the increased efficiency of teachers, as evidenced by the reduction in the amount of time needed to complete administrative responsibilities. This improvement allows teachers to devote more time and attention to core instructional activities in the classroom. In addition to increased efficiency, the use of AI also supports greater accuracy in academic data management. Empirical evidence shows that errors in data recording, which were previously common, can be substantially reduced due to the ability of AI systems to automatically validate and process data. As a result, the academic information produced is more consistent and reliable, providing a stronger basis for academic decision-making. In terms of transparency, real-time access to academic data encourages greater openness in the school environment. Teachers, head teachers, and other stakeholders can continuously monitor students' academic progress, enabling more effective supervision and evaluation of learning. In addition, reducing administrative workload directly contributes to teachers' increased focus on planning and implementing learning activities in a more systematic and high-quality manner. Overall, the integration of academic data through AI-based systems promotes more structured and well-coordinated school management. Academic evaluations can be conducted in a more focused and data-driven manner, which in turn supports the improvement of overall education quality.

3.3 Challenges in Implementing AI in Teacher Administration

The results of the study also revealed a number of obstacles to the implementation of AI in schools. The most prominent obstacles were limitations in digital infrastructure, particularly unstable internet access and limited availability of devices in some schools. In addition, differences in digital literacy levels among teachers also affected the speed and effectiveness of AI utilisation. Some teachers still needed technical assistance to be able to operate the system optimally. Issues related to security and protection of student data privacy are also a concern, although no cases of data misuse were found during the research.

Table 3. Obstacles to AI Implementation in Teacher Administration

No	Types of Obstacles	Field Findings	Impact
1	Digital Infrastructure	Limited internet and devices	Uneven implementation
2	Teachers' Digital Literacy	Technological capabilities vary	The utilisation of AI is not yet optimal
3	Data Security	Student privacy concerns	Regulations and security systems are needed
4	Technical Support	Limited assistance	Teachers face difficulties when technical problems arise

Referring to Table 3, the results of the study show that the application of artificial intelligence (AI) in teacher administration still faces various obstacles that affect its effectiveness in schools. The main obstacles are related to limitations in digital infrastructure, particularly unstable internet access and limited supporting devices in a number of schools. These conditions mean that AI-based systems cannot yet be implemented evenly across all educational units. In addition to infrastructure factors, differences in teachers' digital literacy levels also affect the optimal use of AI. Variations in teachers' abilities to operate technology mean that some teachers are not yet able to make the most of AI features, so ongoing assistance and training are still needed. Another obstacle that has arisen is concerns about the security and privacy of student data. Although no cases of data misuse were found during the study, this issue remains an important concern that requires clear regulations and an adequate data security system. In addition, limited technical support is also a factor hindering the implementation of AI. Suboptimal technical support services cause teachers to encounter difficulties when facing technical problems with the system. Thus, the successful implementation of AI in teacher administration is determined not only by the availability of technology, but also by the readiness of human resources, supporting infrastructure, and sustainable policies and support systems.

Discussion

The integration of artificial intelligence (AI) into teacher administration activities in Karawang Regency shows that this technology has a strategic contribution to strengthening education governance and, indirectly, to improving the quality of the learning process. Findings show that the application of AI in administrative functions such as processing student grades, recording attendance, compiling learning achievement reports, and managing academic data has substantially reduced the administrative workload of teachers. This issue is particularly important because excessive administrative responsibilities often limit teachers' ability to fully carry out their pedagogical duties (Kelley & Wenzel, 2025) (Mustika, Hidayat, & Utami, 2025). When teachers' time and efforts are dominated by routine and repetitive administrative tasks, the effectiveness of lesson planning and learning implementation tends to decline (Zawacki-Richter, Marín, Bond, & Gouverneur, 2019) (Yulianti et al., 2024). By automating these administrative tasks, AI provides teachers with greater flexibility to concentrate on designing effective learning strategies, implementing differentiated learning, and guiding students based on their individual needs. Who emphasise that AI in education

serves as a support tool that enhances teachers' professional capabilities rather than replacing their roles (Ekström, 2025). Consequently, improving the quality of education in the context of this study is interpreted as improving the learning process and teacher effectiveness, not merely limited to improving students' academic achievement (Haetami, 2025) (Aravantinos, Lavidas, Komis, Karalis, & Papadakis, 2026).

Addition, findings show that the use of AI increases transparency and accountability in education data management. AI-based administration systems allow academic information to be accessed in real time and in an integrated manner, making it easier for school principals and policymakers to monitor student progress and overall school performance (Wang et al., 2024). This level of transparency is an important indicator of improved education quality, as reliable and open data management supports effective data-driven decision making. In practical terms, systematically organised data helps schools detect learning problems at an early stage, develop appropriate interventions, and implement sustainable policies over time (Safrizal, Yulnetri, & Wulandari, 2023) (Nations, n.d.). Highlight that the adoption of AI in contemporary education systems supports higher-quality education governance by enabling more structured and objective data analysis. In the context of Karawang Regency, the transparency of data generated through AI-based systems also strengthens the relationship between schools, parents, and the wider community (Lena Rusmiyati, Ridwan Abdullah, Siti Zulaikha, & Muh. Takdir, 2025) (Boulhrir & Hamash, 2025). More timely and clear access to information increases public trust in school performance, which in turn encourages the development of a collaborative education ecosystem focused on continuous quality improvement (Abito Bamban Yuuwono, 2025).

Another important point in this discussion concerns the impact of AI integration on improving teachers' digital literacy. Findings indicate that during the initial phase of implementation, not all teachers were equally prepared to use AI technology, especially those with limited experience in digital devices (Javkhedkar, Shrungarkar, & Kulkarni, 2024). However, through continuous training and mentoring, teachers' competence in operating AI-based systems improved significantly (Holmes, Bialik, & Fadel, 2019) (Mehrvarz, Salimi, Abdoli, & McLaren, 2025). This shows that AI integration not only affects administrative processes but also encourages the transformation of teachers' competencies towards greater digital professionalism. The improvement in teachers' digital literacy serves as an important indicator of the improvement in the quality of education, as teachers who are proficient in technology tend to be more adaptable to change and more receptive to learning innovations (Martin, Zhuang, & Schaefer, 2024). These findings are consistent with Chen et al., (2022), who argue that the effectiveness of AI implementation in education largely depends on the readiness and competence of its users, particularly teachers as the main actors in the education system. In addition, improving teachers' digital literacy is very much in line with the Merdeka Belajar (Freedom of Learning) policy, which encourages the flexible and contextual integration of digital technology into the learning process. Therefore, AI not only contributes to improving administrative efficiency but also to strengthening human resource capacity in the education sector (Faid, Amanto, Alfianurrahman, & Jadid, 2024).

The integration of AI in teacher administration also contributes to strengthening the Pancasila Student Profile, the core of Indonesia's Independent Curriculum. The AI system processes administrative data in real time to generate a holistic student development profile, encompassing not only academic achievement but also character traits such as critical reasoning, mutual cooperation, and global diversity (Lišnić, Zaharija, & Mladenović, 2025). Teachers can access analytical reports that show individual student progress patterns, enabling targeted interventions aligned with the Pancasila Student Profile Strengthening Project (P5). These findings align with the Ministry of Education, Culture, Research, and Technology's (2020) vision, which emphasizes digital technology as an enabler of character-based educational transformation, where accurate administrative data serves as the foundation for the sustainable development of students' soft skills (Faizal, Khoirunnisa, & Budiono, 2025).

Within the local policy context of Karawang Regency, AI integration offers a hybrid administration model that can be replicated in other regencies facing similar challenges. The combination of cloud-based AI and blended learning training has proven effective in addressing infrastructure disparities between schools, with an adoption rate reaching 78% in the second implementation phase. This model supports the Karawang Regional Medium-Term Development Plan (RPJMD) 2025-2029 through indicators of administrative efficiency and improved educational outcomes. However, sustainability requires cross-sector collaboration between the Education Office, local technology providers, and universities to develop contextual AI that understands the educational needs of rural Indonesia.

However, this study also identifies structural challenges that can hinder the optimal integration of AI into teacher administration practices. Gaps in digital infrastructure, particularly limited internet connectivity and the availability of technological devices in certain schools, emerge as key factors affecting the effectiveness of AI implementation. This situation shows that efforts to improve the quality of education through technology are closely linked to issues of equitable access. Schools equipped with adequate infrastructure are generally quicker and more effective in adopting AI, while schools in resource-poor areas face a greater risk of being left behind (Untu, Fahrudin, & Effendi, 2025). Who note that the implementation of AI in education has the potential to widen quality gaps if it is not supported by affirmative policies that guarantee equitable access to technology. In addition, issues related to student data security and privacy are critical concerns that need to be carefully considered (Nemani, 2025). The application of AI in educational administration involves the processing of large amounts of students' personal data, making robust data protection mechanisms and a clear regulatory framework essential (Nowell, Norris, White, & Moules, 2017). Chen et al. (2022) emphasise that ethical considerations and data protection must be integrated into the design and implementation of AI systems in education to prevent data misuse and maintain public trust.

Overall, this discussion confirms that the integration of AI into teacher administration practices in Karawang Regency has great potential to improve the quality of education, although its effectiveness is highly dependent on a comprehensive and sustainable approach. The findings indicate that AI can improve teacher efficiency, increase transparency and accountability in education data management, and encourage the development of teacher digital literacy, which is a key indicator of improvement in education quality (Hana Pebriana, Rosidah, Pahlawan Tuanku Tambusai, & Majalengka, 2025). However, challenges related to infrastructure limitations, digital competency gaps, and data security issues show that technology alone is not the only solution. Therefore, AI integration must be accompanied by equity-oriented policies, adequate investment in infrastructure, and sustainable programmes to develop teachers' professional capacity (lilisuryani, 2024). From a theoretical perspective, these findings reinforce the view that the quality of education is shaped not only by classroom teaching practices but also by the effectiveness of the underlying administrative and governance systems. Practically, these findings offer valuable implications for local policymakers in formulating contextual and inclusive strategies for AI implementation, so that the use of technology truly supports sustainable improvements in education quality in Karawang District.

4. CONCLUSION

The use of artificial intelligence (AI) in teacher administration in primary and secondary schools in Karawang Regency has been systematically embedded in various areas of academic management, such as classroom management, student attendance tracking, electronic report card creation, academic record keeping, and monitoring student learning progress. This integration has replaced manual and semi-manual procedures that were previously time-consuming and prone to recording errors, thereby improving the efficiency and accuracy of educational administration. Research findings indicate that the adoption of AI contributes positively to improving the quality of education, as reflected in several operational indicators, including increased teacher efficiency, improved accuracy and consistency of academic data, increased transparency of educational information, a

stronger focus on learning activities by teachers, and better overall school governance. By reducing the administrative workload, teachers can allocate more time and effort to planning and implementing teaching, which ultimately supports the improvement of the learning process. In addition, the availability of integrated and real-time accessible academic data contributes to increased transparency, accountability, and data-driven decision-making, both at the school level and at the policy-maker level. However, this study also found various challenges in the application of AI, particularly those related to limitations in digital infrastructure, differences in teachers' digital literacy levels, lack of technical support, and issues of student data security and privacy. These obstacles indicate that the successful integration of AI into educational administration does not solely depend on the availability of technology, but is also largely determined by the readiness of human resources, equitable access to infrastructure, and the existence of supporting policies and adequate data protection systems. In general, the results of this study confirm that artificial intelligence has significant potential as a strategic means of improving the quality of education through the strengthening of school administration and management systems. However, in order for the use of AI to have an optimal and sustainable impact, a comprehensive approach is needed, including investment in digital infrastructure, continuous strengthening of teachers' capacity and digital literacy, and the formulation of regulations that guarantee data security and protection. These findings have theoretical implications that the quality of education is not only determined by the learning process in the classroom, but also by the effectiveness of the administrative system that supports it, as well as practical implications for policymakers in designing inclusive and contextual AI implementation strategies in line with regional characteristics.

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Conflict of Interest: The author declares that there are no conflicts of interest associated with the conduct, analysis, or reporting of this research. The study was carried out independently and objectively, without any personal, institutional, or financial relationships that could have influenced the interpretation or presentation of the research findings.

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