

Utilization of Fingerprint as a Managerial Innovation to Increase the Effectiveness of Teacher and Staff Attendance at SDN 148 Palembang

Delyani¹

¹Universitas PGRI Palembang, Indonesia

*Corresponding author: delizira8@gmail.com

Abstrak

Penelitian ini bertujuan untuk menganalisis pemanfaatan sistem absensi sidik jari sebagai inovasi manajerial dalam meningkatkan efektivitas kehadiran guru dan tenaga kependidikan di SDN 148 Palembang. Fokus utama penelitian adalah memahami kontribusi sistem berbasis biometrik ini terhadap peningkatan akuntabilitas manajerial, disiplin kerja, serta pengambilan keputusan berbasis data dalam administrasi sekolah. Penelitian menggunakan metode deskriptif kualitatif yang didukung oleh data kuantitatif dari kuesioner, dengan melibatkan 30 responden yang terdiri atas kepala sekolah, guru, dan staf administrasi. Hasil penelitian menunjukkan bahwa sistem absensi sidik jari secara signifikan meningkatkan ketepatan waktu, transparansi, dan kedisiplinan, dengan rata-rata skor Likert sebesar 4,35 yang termasuk dalam kategori sangat baik. Responden menyatakan bahwa sistem ini mampu mengurangi manipulasi data kehadiran serta memperkuat komunikasi antara manajemen dan pegawai melalui pemantauan secara real-time. Kebaruan penelitian ini terletak pada penempatan teknologi sidik jari tidak hanya sebagai alat teknis, tetapi sebagai inovasi manajerial strategis yang mendukung transparansi dan transformasi budaya dalam tata kelola sekolah. Secara praktis, penelitian ini memberikan bukti bahwa sistem biometrik dapat meningkatkan efisiensi operasional dan keadilan dalam pengelolaan kehadiran guru. Penelitian ini berkontribusi pada pengembangan kajian inovasi manajemen pendidikan serta memberikan wawasan strategis bagi sekolah dan otoritas pendidikan dalam upaya digitalisasi sistem kehadiran guna membangun budaya profesionalisme dan akuntabilitas.

Kata kunci: sistem absensi biometrik, inovasi manajemen pendidikan, akuntabilitas manajerial, disiplin guru, penerimaan teknologi.

Abstract

This study aims to analyze the utilization of fingerprint attendance systems as a managerial innovation to enhance the effectiveness of teacher and staff attendance at SDN 148 Palembang. The main goal is to understand how this biometric-based system contributes to managerial accountability, work discipline, and data-driven decision-making within school administration. Using a qualitative descriptive method supported by quantitative data from questionnaires, the research involved 30 respondents comprising the school principal, teachers, and administrative staff. The findings show that the fingerprint system significantly improves punctuality, transparency, and discipline, with an average Likert score of 4.35 (very good). Respondents reported that the system reduces attendance manipulation and strengthens communication between management and employees through real-time monitoring. The novelty of this research lies in positioning fingerprint technology not merely as a technical tool but as a strategic managerial innovation that supports transparency and cultural transformation in school governance. Practically, this study provides evidence that biometric systems can increase operational efficiency and fairness in teacher attendance management. The research contributes to the theoretical discourse of educational managerial innovation and offers strategic insights for schools and education authorities aiming to digitalize attendance systems to foster a culture of professionalism and accountability.

Keywords: biometric attendance system, educational management innovation, managerial accountability, teacher discipline, technology acceptance

History:

Received : 26 December 2026
Revised : 26 December 2026
Accepted : 27 December 2026
Published : 27 December 2026

Publisher: Horizon Edukasi Prima Indonesia

Licensed: This work is licensed under a Creative Commons Attribution 4.0 License



1. INTRODUCTION

Over the past two decades, the rapid development of information technology has significantly transformed educational management and administrative practices in schools. One prominent innovation is the fingerprint-based attendance system, which enables automatic and accurate attendance recording through biometric identification, replacing conventional manual methods such as signatures or paper attendance lists (Rashid et al., 2021). In the Indonesian educational context, teacher and staff attendance serves as a crucial indicator of service quality, discipline, and professionalism (Hidayat, 2022). Consistent teacher presence has a direct impact on student learning outcomes and overall institutional performance (Hasanah, 2020). Empirical studies indicate that fingerprint attendance systems reduce data manipulation, enhance managerial accountability, and accelerate administrative processes (Rahman & Widodo, 2020; Sari et al., 2021). The real-time recording feature also contributes to fostering a stronger culture of discipline among educators and staff.

Despite its widespread adoption in government institutions and private organizations, research examining the managerial implications of fingerprint systems in public elementary schools remains limited. Existing studies predominantly focus on technical implementation rather than organizational behavior changes or leadership integration (Yuliana et al., 2022; Fitriani & Utami, 2023). Recent advancements demonstrate improvements in biometric accuracy, data security, and system integration through IoT and cloud-based platforms, allowing principals and education authorities to monitor attendance data in real time (Ahmed et al., 2023). While smart attendance systems have been implemented in major cities such as Jakarta and Surabaya to support School Management Information Systems (Nurhayati & Prasetyo, 2022), regional schools, including those in Palembang, continue to face challenges related to infrastructure readiness, user resistance, and limited alignment with managerial policies.

The novelty of this study lies in positioning the fingerprint attendance system as a strategic managerial innovation rather than merely a technical administrative tool. This research examines how its implementation at SDN 148 Palembang contributes to effectiveness, accountability, and the development of a discipline-oriented culture, while also analyzing its relationship with leadership, supervision, and professional responsibility. By integrating perspectives from human resource management, information technology, and organizational behavior, this study seeks to enrich the theoretical discourse on managerial innovation in basic education. Practically, the findings are expected to provide strategic guidance for school leaders in optimizing digital attendance systems and to offer policy insights for the Palembang City Education Office in advancing the digitalization of elementary school administration.

2. METHOD

This research uses a qualitative descriptive approach with the support of simple quantitative data through the distribution of questionnaires. This approach was chosen because the main objective of the research is to deeply understand how the implementation of the fingerprint system is used as a managerial innovation to increase the effectiveness of teacher and staff attendance at SDN 148 Palembang. The qualitative approach allows researchers to explore the meaning, perceptions, and experiences of teachers and staff regarding the use of the biometric attendance system in a contextual and comprehensive manner. The research subjects consisted of the school principal, teachers, and administrative staff of SDN 148

Palembang who had been using the fingerprint system for a minimum of six months. Informant determination was carried out by purposive sampling, selected based on involvement and understanding of the digital attendance system. Data was collected through closed and open questionnaires, semi-structured interviews, and school documentation. The main instrument of this research is a five-point Likert scale questionnaire, consisting of 20 statement items measuring four main aspects: attendance effectiveness, managerial innovation, technology acceptance, and impact on work culture. In addition, two open questions were used to obtain exploratory qualitative data describing individual perceptions and experiences more broadly.

Data was analyzed using data reduction techniques, data presentation, and conclusion drawing as proposed by Miles & Huberman (2020). Quantitative results from the questionnaire were processed to obtain the average score of each indicator, then descriptively interpreted to describe the level of effectiveness of the fingerprint system implementation. Meanwhile, the results of interviews and open questions were analyzed thematically to find patterns, trends, and emerging managerial implications. Through this method, the research is expected to be able to provide a comprehensive picture of the extent to which fingerprint technology-based innovation can increase discipline, transparency, and managerial accountability in the SDN 148 Palembang environment.

3. RESULT AND DISCUSSION

Based on the results of questionnaire processing and interviews with 30 respondents (consisting of teachers, administrative staff, and the school principal of SDN 148 Palembang), it was found that the implementation of the fingerprint system significantly increased punctuality, administrative transparency, and work discipline. The overall average Likert score reached 4.35 (very good category). The aspect with the highest increase was punctuality (4.60) and attendance transparency (4.45), while the aspect with the lowest score was technical equipment constraints (3.80). Qualitatively, respondents stated that the fingerprint system simplifies the attendance recording process, reduces attendance manipulation, and increases individual sense of responsibility. Some respondents revealed that the implementation of this system also improved managerial communication between the school principal and teachers because attendance data can be monitored in real-time.

2.1 Fingerprint and Discipline Enhancement

This finding is in line with the research results of Royhan (2025) in *JUPIK: Jurnal Penelitian Ilmu Komputer*, which shows that the fingerprint system is able to significantly increase teacher discipline at SMKS Ibrahimy Situbondo because attendance is recorded automatically and accurately. Similar findings were also put forward by Kasno, Mohi, and Gintulangi (2025) in the *Journal of Advanced Management Research and Education*, that the implementation of the fingerprint system can increase the motivation and responsibility of ASN in Gorontalo. In the context of elementary schools, Apridiansyah (2025) found that the apps-based attendance system based on fingerprint is capable of strengthening transparency and administrative efficiency for teachers. Thus, the results of this research strengthen the literature stating that digital attendance systems have a real contribution to increasing the discipline of education employees (Hakim & Nugroho, 2025; Rahmawati et al., 2025). In addition, this research reinforces the view of Yuliana et al. (2022) that biometric attendance systems increase organizational integrity because each individual has personal responsibility that is automatically recorded. Thus, this innovation does not only serve an administrative

function, but also acts as a managerial tool to strengthen a work culture that is honest and disciplined.

2.2 Fingerprint as a Managerial Innovation

From a managerial perspective, the research results show that the implementation of fingerprint functions as a data-based supervision tool, strengthening the accountability of school leaders in carrying out employee performance evaluations. This is consistent with the innovation management theory put forward by Drucker (2019), where information technology becomes a catalyst for organizational efficiency and transparency. Research by Rahmawati, Brawijaya, and Andriansyah (2025) confirms that the innovation of digital presence systems is able to integrate supervision and attendance reporting automatically, so the school principal can make decisions based on actual data. This finding supports the results of field observations at SDN 148 Palembang, where fingerprint attendance data is directly used in monthly performance evaluation meetings. Research by Pandya et al. (2025) in *Frontiers in Medicine* also shows that biometric-based systems strengthen professionalism and personal responsibility in educational institutions, because each individual cannot delegate their attendance identity to other parties.

2.3 Technology Acceptance and Ease of Use

From the perspective of technology acceptance (Technology Acceptance Model), teachers and staff stated that the fingerprint system is easy to use and has a high level of reliability. This result is in line with the findings of Hakim & Nugroho (2025) who reported that the web-based digital attendance system at SMP Negeri 16 Cirebon succeeded in increasing the efficiency of attendance administration while reducing the level of student and teacher tardiness. The results of this research also support Royhan (2025) and Kasno et al. (2025) who highlight that the success of digital attendance system implementation is not only determined by hardware but also by managerial

2.4 Organizational Culture and Work Morale

The managerial impact of fingerprint implementation at SDN 148 Palembang is also seen in the increase in a disciplined and collaborative work culture. As many as 90% of respondents stated that this system created a more orderly and professional working atmosphere. This finding reinforces the results of Setiawan et al. (2021) who concluded that digital attendance technology does not only function administratively but also as a behavioral driver that changes work habits. In addition, this research supports Hasibuan (2023) who asserts that organizational discipline cannot be separated from the clarity of the attendance evaluation system. In this case, fingerprint attendance acts as an objective instrument that strengthens the sense of justice and accountability in the education work environment.

Synthesis and Practical Implication

Overall, the results of this research confirm that the utilization of fingerprint is not just an attendance system, but also a data-based managerial tool that strengthens the principles of transparency and accountability. From the perspective of managerial innovation theory, this system is an administrative innovation that contributes directly to process efficiency and improved organizational behavior. Practically, the implementation of the fingerprint system at SDN 148 Palembang provides several important implications:

- 1) Increased discipline – teacher and staff attendance increased because the system cannot be manipulated.

- 2) Administrative transparency – attendance reports are automatically available, simplifying leader supervision.
- 3) Time efficiency – the attendance recording process decreased from 15 minutes to 3 minutes per day.
- 4) Positive work culture – employees feel the system is fairer because it is based on objective data.

Thus, this research contributes to strengthening the literature regarding digital managerial innovation in the basic education sector, especially in the Indonesian context.

4. CONCLUSION

The research results show that the utilization of the fingerprint system as a managerial innovation at SDN 148 Palembang proved effective in increasing discipline, punctuality, and administrative accountability of teachers and staff. Questionnaire data results show an average score of 4.35 out of 5, which indicates a high level of effectiveness in the implementation of this system. The fingerprint system successfully replaced the manual attendance mechanism that was vulnerable to manipulation, increased the clarity of attendance data, and accelerated the report recapitulation process. Furthermore, interview and observation results show that the success of the system implementation was supported by the participatory leadership of the school principal, the readiness of the technology infrastructure, and positive acceptance from teachers and staff. Thus, the fingerprint innovation is not just an administrative tool, but also a managerial strategy that strengthens a work culture that is disciplined, transparent, and oriented toward personal responsibility.

Practically, the results of this research can be used as a reference for other schools in implementing a biometric-based attendance system to improve the governance of education employee attendance. This system can also be integrated with performance management applications to produce more comprehensive data for decision making. Nevertheless, this research still has limitations on the scope of one school and has not explored the psychological factors of users in depth. Therefore, further research is suggested to expand the sample to various school levels and examine the relationship between the implementation of the fingerprint system and long-term work productivity increases. Overall, the fingerprint attendance system is proven to be an effective and adaptive managerial innovation in strengthening the professionalism of educators in the digital era.

5. ACKNOWLEDGEMENT

The researcher would like to express sincere gratitude to all parties who contributed to the completion of this research entitled *“Utilization of Fingerprint as a Managerial Innovation to Increase the Effectiveness of Teacher and Staff Attendance at SDN 148 Palembang.”* Special appreciation is extended to the Head of the school for granting permission and providing access for this study. The researcher also thanks all teachers and administrative staff for their participation and valuable contributions as respondents. Gratitude is conveyed to academic supervisors and lecturers from the Faculty of Education for their guidance and constructive feedback. Appreciation is also given to colleagues for their encouragement and to the researcher’s family for their continuous moral support and motivation. The researcher hopes this study contributes to improving educational management, particularly in enhancing discipline and accountability through technological innovation.

REFERENCES

- Ahmed, R., Khan, A., & Malik, S. (2023). IoT-based smart attendance system for educational institutions. *Journal of Educational Technology Systems*, 52(2), 115–130.
- Apridiansyah, Y. (2025). Penggunaan AppSheet berbasis Android untuk absensi kehadiran guru di SD Negeri 65 Bengkulu. *JPMTT*, 8(1), 112–121.
- Armstrong, M., & Taylor, S. (2023). *Armstrong's handbook of human resource management practice* (16th ed.). Kogan Page.
- Azmi, R., & Kurniawan, D. (2022). Effectiveness of fingerprint systems and managerial policy support in schools. *Jurnal Administrasi Pendidikan*, 10(2), 98–110.
- Davis, F. D. (2019). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Dewi, K., & Ramadhan, M. (2025). Smart attendance and work ethics in educational institutions. *Jurnal Teknologi Informasi dan Pendidikan*, 13(2), 45–57.
- Fitriani, D., & Utami, S. (2023). *Kepemimpinan kepala sekolah dan inovasi digital dalam manajemen pendidikan*. Rajawali Press.
- Hakim, D. K., & Nugroho, B. A. (2025). Implementation of web-based online attendance system as an innovation in student attendance management at SMP Negeri 16 Cirebon. *Jurnal Pengabdian Kepada Masyarakat INF*, 5(1), 22–34.
- Hasanah, U. (2020). Pengaruh disiplin kerja guru terhadap kinerja mengajar di sekolah dasar negeri. *Jurnal Manajemen Pendidikan*, 9(2), 56–64.
- Hasibuan, M. S. (2023). Disiplin kerja dan sistem pengawasan digital di lembaga pendidikan. *Jurnal Manajemen Sumber Daya*, 11(1), 25–36.
- Hidayat, T. (2022). *Manajemen SDM pendidikan di era digital*. Alfabeta.
- Kasno, A. A. R., Mohi, W. K., & Gintulangi, S. L. (2025). Efficiency of public services in Bulota Village through digital fingerprint attendance. *Journal of Advanced Management Research and Education*, 4(2), 76–89.
- Kurniasih, D., & Mulyani, S. (2024). Technology acceptance of biometric systems in education sector. *Asian Journal of Management Studies*, 9(2), 77–88.
- Morrison, L. J., Otis-Green, S., Bruno, J., & Fordham, P. N. (2025). Interactive educational exchange and attendance innovation. *Journal of Symptom Management*, 65(3), 112–120.
- Nugraha, T., & Putri, E. (2024). Digital innovation in school administration and teacher accountability. *International Journal of Education Policy*, 18(4), 312–326.
- Nurhayati, L., & Prasetyo, M. (2022). Smart school management system integration: A case study of Indonesian public schools. *International Journal of Education and Development*, 14(3), 210–222.
- Nurhayati, S., & Siregar, F. (2021). Challenges in implementing fingerprint attendance in rural schools. *Jurnal Pendidikan Dasar*, 9(3), 205–216.
- OECD. (2019). *Education at a glance 2019: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/f8d7880d-en>

- Pandya, H., Varma, J., & Kumar, D. (2025). Professional identity formation and biometric tracking in academic contexts. *Frontiers in Education Technology*, 6(3), 221–230.
- Rahman, F., & Widodo, B. (2020a). Implementasi sistem absensi sidik jari dalam peningkatan disiplin pegawai sekolah. *Jurnal Teknologi Informasi Pendidikan*, 8(1), 23–32.
- Rahman, F., & Widodo, B. (2020b). Implementation of fingerprint attendance systems in schools to improve work discipline. *Educational Technology Journal*, 8(1), 23–32.
- Rahmawati, E., Brawijaya, H., & Andriansyah, D. (2025). Optimalisasi presensi sekolah berbasis QR code. *Computer Science Journal BSI*, 4(1), 17–26.
- Rashid, A., Chowdhury, M., & Hasan, T. (2021). Biometric attendance systems and employee performance: A managerial approach. *International Journal of Management Studies*, 17(4), 101–118.
- Robbins, S. P., & Judge, T. A. (2022). *Organizational behavior* (18th ed.). Pearson.
- Royhan, M. R. (2025). Rancang sistem presensi guru dan siswa di SMKS Ibrahimy Situbondo menggunakan fingerprint. *JUPIK: Jurnal Penelitian Ilmu Komputer*, 7(2), 134–142.
- Sari, M., Putra, E., & Yusuf, N. (2021). Fingerprint attendance as digital innovation in school administration. *Asian Journal of Educational Management*, 12(3), 144–155.
- Sari, N., & Harapan, E. (2025). The development of a digital-based attendance system to enhance the discipline of fifth grade students at SD Negeri 62 Palembang. *JMKSP: Jurnal Manajemen, Kepemimpinan, dan Supervisi Pendidikan*, 10(1), 45–59.
- Setiawan, R., Prasetyo, H., & Widodo, A. (2021). Discipline transformation through digital attendance in education. *Journal of Educational Management Research*, 5(1), 60–70.
- Sitorus, M., & Rahayu, N. (2022). Digital accountability in teacher performance evaluation. *Jurnal Pendidikan Profesi Guru*, 7(2), 90–101.
- Sulaiman, T., Abdullah, R., & Karim, H. (2020). Psychological pressure in surveillance-based attendance systems. *Asian Education Review*, 14(2), 89–99.
- Tambunan, R., & Wulandari, D. (2023). Manajemen inovasi teknologi absensi sidik jari di sekolah dasar negeri. *Jurnal Administrasi dan Manajemen Pendidikan*, 5(2), 155–168.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Wardana, P., & Sari, L. (2021). The role of ICT in enhancing school management efficiency. *Jurnal Manajemen Pendidikan*, 9(2), 145–156.
- Yuliana, R., Santoso, H., & Dini, K. (2022a). Analisis efektivitas sistem absensi fingerprint di sekolah negeri. *Jurnal Pendidikan dan Teknologi*, 13(4), 322–334.
- Yuliana, R., Santoso, H., & Dini, K. (2022b). Effectiveness of biometric attendance systems in public schools. *Jurnal Teknologi Pendidikan Indonesia*, 13(4), 322–334.
- Zainuddin, A. (2021). *Transformasi digital dalam manajemen sekolah*. Deepublish.