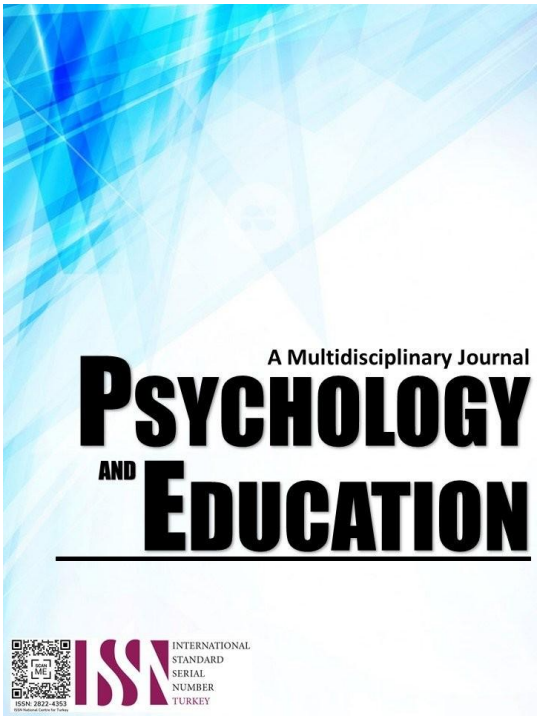
MANUAL AND BIOMETRIC SCHOOL LOG MANAGEMENT SYSTEMS IN A PRIVATE SCHOOL IN UBAY, BOHOL: AN EVALUATIVE STUDY



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Research Article

Manual and Biometric School Log Management Systems in a Private School in Ubay, Bohol: An Evaluative Study

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Abstract

Accurate and secure attendance management remains a persistent administrative concern in many small private educational institutions that continue to rely on manual logging systems. This study aimed to evaluate manual and biometric school log management systems used for employee attendance in a private school in Ubay, Bohol. Using a descriptive–evaluative research design, the study involved 20 employees, including teaching and non-teaching personnel. Data were gathered using a researcher-developed questionnaire and analyzed using frequency counts and percentage distribution. Results indicated that the manual system, which utilized a Bundy clock and Daily Time Record, was associated with risks of record loss, vulnerability to proxy attendance, difficulty in updating attendance-related information, and inefficiency in report generation. In contrast, employees' responses indicated that the implemented biometric system addressed these concerns by improving record security, enabling more accurate attendance recording, enabling more efficient payroll data updates, and enabling faster attendance report generation. The findings further revealed favorable employee acceptance of the biometric system in terms of usability and information processing speed. This study underscores the practical value of transitioning from manual to biometric log management systems and provides empirical evidence relevant to small private schools seeking to improve attendance administration.

Keywords: *manual attendance system, biometric attendance system, school log management, employee attendance, evaluative study, private school*

Introduction

Educational institutions increasingly adopt computer-based technologies to improve administrative efficiency, data accuracy, and accountability in daily operations. Attendance monitoring remains a critical administrative function, as it directly influences payroll computation, personnel evaluation, and institutional management. However, traditional manual attendance systems, such as logbooks and Bundy clocks, remain widely used in many educational institutions, especially in small private schools. These manual systems are consistently associated with inaccuracies, proxy attendance, record loss, and delays in report generation, which undermine operational reliability and data security (Rivera, 2021; Kumar, 2025).

Globally, biometric technologies have gained prominence as reliable solutions for attendance and identity verification due to their ability to authenticate individuals based on unique physiological characteristics. Fingerprint-based biometric systems are widely adopted because of their accuracy, cost-effectiveness, and ease of integration in organizational settings (Gaikar & Patil, 2025; Gawade, 2023). Studies conducted across various sectors, including education and public administration, demonstrate that biometric attendance systems significantly reduce proxy logging, improve data integrity, and enhance administrative efficiency (Indico, 2016; Adewole, 2018).

In the Philippine context, the adoption of biometric systems is supported by the Data Privacy Act of 2012, which provides a legal framework for the ethical processing and protection of personal and sensitive information while enabling institutions to pursue technological innovation. Several government agencies and local government units have implemented biometric timekeeping systems to address attendance fraud, payroll discrepancies, and inefficiencies in manual record handling. These initiatives reflect a national trend toward automated attendance solutions that balance operational efficiency with data protection requirements (Philippine Star, 2014; Department of Social Welfare and Development, 2013).

The present study was conducted at a private school in Ubay, Bohol, which currently relies on a manual attendance system using a Bundy clock and a Daily Time Record (DTR). Unlike the original phrasing that described the institution in promotional terms, the present study adopts a neutral institutional description consistent with academic standards. As reported in previous studies, the institution faces challenges related to unsecured handling of personnel records, difficulty updating attendance-related information, vulnerability to proxy attendance, and time-consuming preparation of attendance reports (Rivera, 2021; Kumar, 2025). Despite the growing body of literature on biometric attendance systems, empirical studies focusing on small, community-based private schools—particularly those located in rural settings—remain limited.

This study adopts a descriptive–evaluative research design. It aims to assess the effectiveness and limitations of the existing manual attendance system as a basis for developing a biometric School Log Management System. This clarification resolves ambiguity in the original manuscript regarding whether the study evaluates an existing system or implements a new one. Specifically, the study evaluates the current system with respect to record security, attendance-logging accuracy, the efficiency of attendance-related data updates, and

report generation. The findings are intended to inform system design requirements rather than to evaluate an already implemented biometric system.

A School Log Management System was identified as the appropriate technological intervention because it directly addresses the documented weaknesses of manual attendance processes. Prior studies emphasize that biometric-based log management systems enhance accuracy, eliminate proxy attendance, and streamline administrative tasks by enabling real-time data capture and automated reporting (Gaikar & Patil, 2025; Gawade, 2023; Sulistyo et al., 2022). Unlike large-scale enterprise systems, the proposed solution is conceptualized to be context-appropriate and feasible for small private educational institutions.

The results of this study contribute not only to institutional decision-making regarding the modernization of the attendance system but also to the broader body of knowledge on digital transformation in small educational organizations. By providing empirical evidence on the limitations of manual attendance systems and employees' readiness for biometric solutions, the study offers practical insights applicable to other private schools and similar institutions facing comparable administrative challenges.

Research Questions

This study aimed to evaluate manual and biometric school log management systems used for employee attendance in a private school in Ubay, Bohol.

1. What are the employees' assessments of the security and safety of personnel records under the manual and biometric school log management systems?
2. What attendance recording practices and mechanisms for preventing proxy attendance are present in the manual and biometric school log management systems?
3. What conditions characterize the updating of attendance-related information affecting payroll liquidation under the manual and biometric systems?
4. What conditions characterize the generation of attendance and timekeeping reports under the manual and biometric school log management systems?
5. What indicators reflect employees' acceptance of the biometric school log management system in terms of usability and speed of information processing?

Literature Review

Global Trends in Biometric Attendance and Identity Management

Biometric technologies have gained global prominence as secure and reliable tools for identity verification and attendance monitoring across public and private institutions. As organizations confront increasing risks from identity fraud, proxy attendance, and data manipulation, biometric systems authenticate individuals using unique physiological characteristics, such as fingerprints. Among the various biometric modalities, fingerprint-based systems remain the most widely adopted due to their accuracy, cost-efficiency, and ease of deployment in organizational settings (International Biometric Group, 2007; Gaikar & Patil, 2025).

Recent empirical studies demonstrate that biometric attendance systems significantly improve data integrity and operational efficiency compared with manual timekeeping methods. Gaikar and Patil (2025) reported that fingerprint-based attendance systems effectively prevent proxy attendance by ensuring real-time identity verification. Similarly, Gawade (2023) found that automated attendance systems integrated into enterprise platforms reduced administrative workload and enhanced reporting efficiency. These findings underscore a growing global shift toward biometric-based attendance management to address the limitations of traditional manual systems.

Legal and Ethical Frameworks for Biometric Systems in the Philippines

In the Philippine context, the implementation of biometric systems is governed by the Data Privacy Act of 2012, which establishes standards for the lawful, ethical, and secure processing of personal and sensitive information. The Act mandates informed consent, limits data use to declared purposes, and assigns accountability for personal information to personal information controllers, thereby providing a legal foundation for institutions adopting biometric technologies.

Several government agencies have implemented biometric systems in compliance with this framework. Makati City Government (2014) implemented an Automated Biometrics Timekeeping System to enhance transparency and eliminate proxy attendance among government employees. The Department of Social Welfare and Development (2013) adopted biometric fingerprint verification to prevent fraudulent claims in welfare distribution programs. These institutional applications demonstrate the feasibility and regulatory compatibility of biometric systems within Philippine organizational settings, including educational institutions.

Institutional Applications of Biometric Attendance Systems

Studies documenting institutional use of biometric attendance systems consistently report improvements in accuracy, accountability, and administrative efficiency. Indico (2016) developed a fingerprint-based attendance and payroll system for a tertiary institution, resulting in improved record accuracy and faster payroll processing. Adewole (2018) likewise reported reductions in buddy punching,

lateness, and attendance-related errors following the implementation of biometric attendance systems.

International evidence supports these findings. Cottage Delight in the United Kingdom reported significant reductions in payroll processing time after implementing a biometric-based attendance system (Carval HR Unity Software, 2017). Collectively, these studies establish that biometric attendance systems are effective across different organizational contexts, although most existing studies focus on large institutions or higher education settings.

Limitations of Manual Attendance and Record-Handling Systems

Manual attendance systems such as logbooks, Bundy clocks, and handwritten Daily Time Records are consistently identified in the literature as vulnerable to errors, data loss, and manipulation. Rivera (2021) emphasized that paper-based attendance systems lack centralized control, making them susceptible to proxy logging and unauthorized record alterations. Kumar (2025) further noted that manual systems hinder timely report generation and complicate payroll-related data processing.

Studies examining payroll data flows reveal that manual updates to attendance records often lead to delays and inconsistencies. Gawade (2023) and Sulistyo et al. (2022) reported that the absence of automated synchronization between attendance and payroll systems increases administrative workload and the likelihood of computation errors. These limitations are particularly evident in small private educational institutions that continue to rely on manual attendance practices.

Synthesis of Findings and Identified Research Gaps

While literature demonstrates substantial advancements in biometric attendance technologies, notable gaps remain. Most studies focus on government agencies, large corporations, and higher education institutions, with limited attention to small, community-based private schools. There is insufficient empirical evidence examining the transition from manual to biometric attendance systems within rural private educational settings, particularly in the Philippine context.

Moreover, few studies adopt an evaluative approach that examines both manual and newly implemented biometric systems within the same institutional setting. This gap limits understanding of how system transition affects record security, attendance accuracy, payroll-related data handling, and report generation from the perspective of system users. Addressing this gap, the present study evaluates manual and biometric school log management systems in a private school in Ubay, Bohol, thereby contributing context-specific evidence to the literature on the modernization of attendance systems in small educational institutions.

Methodology

Research Design

The study employed a descriptive–evaluative research design to assess the manual and biometric school log management systems used for employee attendance in a private school in Ubay, Bohol. Descriptive research designs are appropriate when the aim is to systematically document characteristics, conditions, or phenomena without manipulating variables or establishing causal effects (McCombes, 2019). Descriptive evaluation approaches further allow researchers to describe and appraise the implementation and performance of an existing system within its context, often using structured responses to assess how well the system operates based on user perspectives (Gu & Warren, 2017).

Respondents

The study was conducted at a private educational institution in Ubay, Bohol, which uses attendance systems to monitor employee time-in and time-out records. The institution served as an appropriate setting for evaluating the previously used manual attendance system and assessing employees' acceptance of a biometric school log management system. To ensure confidentiality and adherence to ethical research standards, the institution's name is withheld. The respondents comprised 20 employees, including both teaching and non-teaching personnel, who directly used the school's log management systems. A complete enumeration sampling technique was employed, including all eligible system users as respondents, ensuring comprehensive representation and minimizing sampling bias within the institutional context. This integrated description of the research setting and participant selection provides transparency regarding the study context and supports methodological rigor and replicability.

Instrument

Data were gathered using a researcher-developed questionnaire designed to assess employees' perceptions and experiences with the manual and biometric school log management systems. The instrument was structured into five sections: (1) security and safety of personnel records, (2) attendance recording practices and proxy-attendance prevention, (3) updating of attendance-related information affecting payroll liquidation, (4) report generation, and (5) system acceptability in terms of usability and processing speed. Items were presented in checklist and closed-ended formats to allow quantitative analysis using frequency counts and percentages. The instrument underwent content validation through expert review to ensure clarity, relevance, and alignment with the study objectives. Revisions were incorporated based on expert feedback prior to administration.

Procedure

Prior to data collection, formal permission to conduct the study was secured from the school administration through a written request. Upon approval, the researcher informed the respondents of the study's purpose, the voluntary nature of participation, and the confidentiality of their responses. Questionnaires were personally distributed to all respondents and collected after completion. All accomplished instruments were checked for completeness and encoded for analysis.

Data Analysis

Data were analyzed using descriptive statistics, specifically frequency counts and percentage distributions, to summarize employees' responses to each questionnaire item. This statistical treatment was appropriate for the descriptive–evaluative nature of the study and allowed a clear presentation of response patterns regarding the manual and biometric school log management systems. Results were presented in tabular form and interpreted based on observed distributions.

Ethical Considerations

Ethical standards were strictly observed throughout the study. Participation was voluntary, and informed consent was obtained from all respondents prior to data collection. Respondents were assured of anonymity, confidentiality, and their right to withdraw from the study at any time without penalty. Data were used solely for academic purposes and were handled in accordance with the provisions of the Data Privacy Act of 2012.

Results and Discussion

Security and Safety of Personnel Records

The results show that employees placed high importance on securing attendance logs and personal information. All respondents (100%) indicated that data security is essential in handling personnel records. However, when the manual attendance system was assessed, 80% of respondents acknowledged the possibility of losing attendance records, while only 60% reported feeling secure when filling out the logbook. These findings indicate that although employees recognize the importance of data security, the manual system does not adequately safeguard against data loss or unauthorized access.

Table 1. *Security of Current Personnel Record Handling (N = 20)*

Indicator	*f*	*%*
1. Data security is important for securing logs	20	100%
2. Data security is important for personal information	20	100%
3. Possibility of losing logs – Yes	16	80%
4. Possibility of losing logs – No	2	10%
5. Possibility of losing logs – Maybe	2	10%
6. Feel secure when filling logbook – Yes	12	60%
7. Feel secure – Maybe	8	40%
8. Perceived security of current logs – Very secure	10	50%
9. Perceived security – Secure	10	50%

In contrast, responses regarding the biometric system reflect improved perceptions of record security. The use of biometric authentication addresses concerns related to unauthorized logging and record tampering by linking attendance entries directly to individual identities. Similar observations were reported by Rivera (2021) and Kumar (2025), who found that paper-based attendance systems lack centralized control and are vulnerable to manipulation. The present findings suggest that transitioning to a biometric log management system strengthens confidence in the security and integrity of personnel records, particularly in small private educational institutions.

Attendance Recording Practices and Proxy Attendance Prevention

Table 2 presents employees' responses regarding the current Daily Time Record (DTR) process used in the school and its vulnerability to proxy attendance. The table summarizes how attendance is recorded, the tools utilized, and the respondents' experience with the current logging procedure.

Table 2. *Current Attendance Recording Method and Possibility of Proxy Attendance*

Indicator	*f*	*%*
1. Feel secure – Maybe	8	40%
2. Feel secure – Maybe	8	40%
3. Feel secure – Maybe	8	40%
4. Feel secure – Maybe	8	40%
5. Feel secure – Maybe	8	40%
6. Feel secure – Maybe	8	40%
7. Feel secure – Maybe	8	40%
8. Perceived security – Secure	10	50%

As shown in Table 2, attendance recording under the manual system relied entirely on the Bundy clock and Daily Time Record, as reported by all respondents (100%). No digital or biometric authentication methods were used. Although 80% of respondents found the manual logging process convenient, the lack of identity verification mechanisms exposes the system to the risk of proxy attendance.

The findings indicate that convenience alone does not ensure accuracy in attendance monitoring. Consistent with Gaikar and Patil (2025), systems that rely solely on manual input allow attendance entries without verification of physical presence. In contrast, biometric attendance systems require fingerprint authentication, thereby reducing opportunities for proxy attendance and strengthening attendance accuracy.

Updating of Attendance-Related Information Affecting Payroll Liquidation

Table 3 shows that all respondents (100%) reported that the manual attendance system could not easily update employee information. The responsibility for updating attendance-related records was assigned exclusively to non-teaching personnel. This centralized, manual process increases administrative workload and may lead to delays or inconsistencies in payroll data handling.

Table 3. *Indicators Related to Payroll Liquidation and Data Updating (N = 20)*

Indicator	*f*	*%*
1. Current system can easily update employee information – Yes	0	0%
2. Current system can easily update employee information – No	20	100%
3. Responsible for updating employee information – Teaching Staff	0	0%
4. Responsible for updating employee information – Non-Teaching Staff	20	100%

The findings align with those of Gawade (2023) and Sulistyo et al. (2022), who observed that manual attendance systems complicate payroll processing due to delayed updates and reliance on human intervention. The results indicate that the lack of automated update mechanisms in the manual system limits efficiency in attendance and payroll record management.

Generation of Attendance and Timekeeping Reports

Table 4 presents the respondents' assessments of report generation under the manual attendance system. All respondents (100%) indicated that the system could not easily generate attendance and timekeeping reports. Although reports for teaching and non-teaching staff, and daily time records, were produced, they required manual compilation and verification.

Table 4. *Efficiency of Report Generation in the Current DTR System*

Indicator	*f*	*%*
1. Current system can easily generate reports – Yes	0	0%
2. Current system can easily generate reports – No	20	100%
3. Reports generated – Teaching Staff Logs	10	50%
4. Reports generated – Non-Teaching Staff Logs	5	25%
5. Reports generated – Daily Time Records	5	25%

These findings demonstrate that report generation under the manual system is time-consuming and labor-intensive. Kumar (2025) emphasized that manual report preparation increases administrative burden and delays access to attendance data. Automated log management systems, by contrast, support faster retrieval and organization of attendance records, addressing inefficiencies inherent in manual reporting processes.

Employee Acceptance of the Biometric School Log Management System

Table 5 reflects employees' acceptance of the biometric school log management system. All respondents (100%) agreed that implementing a new system was necessary, and 90% preferred the biometric system. Furthermore, 80% identified faster information processing as the most important system feature, whereas 20% emphasized user-friendliness.

Table 5. *Preferred Improvements and Features for the Proposed System (N = 20)*

Indicator	*f*	*%*
1. Necessary to develop a new School Log Management System – Yes	20	100%
2. Prefer using a new system – Yes	19	90%
3. School will benefit from proposed system – Yes	19	90%
4. Want system implementation in MELCU – Yes	20	100%
5. Proposed system will have a big impact – Yes	18	80%
6. Preferred feature – User-friendly	2	20%
7. Preferred feature – Faster information processing	18	80%

These results indicate favorable employee acceptance of the biometric system, suggesting readiness for system transition. Sulistyo et al. (2022) emphasized that user acceptance is essential for the sustainability of digital attendance systems in educational institutions. The findings suggest that employees perceive the biometric system as a practical improvement over manual attendance practices.

Conclusions

This study evaluated the manual school log management system and assessed employees' acceptance of a biometric alternative in a private school in Ubay, Bohol. Findings revealed that the manual system is limited by weak record security, vulnerability to proxy attendance, difficulty in updating payroll-related information, and inefficient report generation. In line with the study objectives, employees strongly accepted a biometric school log management system, particularly for its potential to improve data accuracy and processing speed. These results indicate that manual attendance practices are no longer sufficient for efficient administrative management in small private educational institutions. Consequently, school administrators may consider adopting biometric log management systems supported by basic user orientation to ensure proper implementation. Future research may examine actual system implementation outcomes, payroll integration, and broader institutional settings to strengthen empirical evidence and guide policy and practice.

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