Labtrack: A Comprehensive Approach to Attendance Tracking Computer Usage Monitoring - The Great Plebeian College

Mary Ann N. Bolasco., Glenzyl L. Costales., Paul Bryan E. Saldivar., Christian David C. Valdez., Rosel Dela L. Cruz, MIT

College of Management & Technology, Department of Information Technology, Pangasinan State University, Philippines

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ABSTRACT

In the digital age, educational institutions face an increasing need for secure and efficient management of computer lab facilities, particularly in terms of attendance tracking and asset protection. Traditional paper-based attendance monitoring system are not only prone to errors but also inefficient and insecure, failing to meet the demands of modern learning environments. This study proposes the development of an Attendance and Computer Monitoring System, designed to automate attendance tracking, enhance security, and improve overall lab management. The Attendance and Computer Monitoring System brings multiple benefits to stakeholders. For administration, it supports improved resource allocation and equipment protection. Faculty members gain a reliable tool for monitoring student engagement and managing lab usage effectively. Students benefit from a more secure learning space, while the system also serves as a model for future implementations in real-time monitoring and data management. The project's usability was tested through a survey distributed to various user groups, ensuring that the system aligns with user needs and expectations. Findings demonstrate that the Attendance and Computer Monitoring System significantly enhances security, streamlines attendance processes, and promote digital responsibility within computer labs, positioning it as a valuable tool for modern educational institutions.

Keywords: Attendance and Computer Monitoring System, computer labs, security, automated attendance

INTRODUCTION

Student attendance plays a vital role in academic performance and overall institutional management. Traditional attendance methods, such as roll calls and manual sign-ins, are often time-consuming and prone to errors or manipulation [1]. To improve accuracy and reduce human intervention, fingerprint-based biometric systems have been widely adopted. These systems rely on unique human characteristics, offering a more secure and reliable way to verify student identity [2]. Some modern systems go further by integrating fingerprint authentication with Internet of Things (IoT) technologies and ultrasonic sensors, allowing for smart automation and real-time monitoring [3].

In addition to biometrics, RFID technology has become a common solution for automated attendance. RFID systems use tags or ID cards to record attendance quickly and efficiently, especially in environments with large student populations [4]. They are capable of processing multiple entries without direct contact, making them ideal for fast-paced environments [5]. Literature reviews show a growing trend in combining different technologies to improve data management, system flexibility, and overall accuracy [6]. Some systems use RFID-based ID cards for quick identification [7], while others merge passive RFID with biometric verification for enhanced security [8]. Web-based and real-time platforms further improve access to data, allowing both students and staff to monitor attendance records easily [9]. More advanced setups even include long-range RFID and camera integration for performance tracking and remote monitoring [10].

METHODOLOGY

This study employed a developmental descriptive research design to analyze the challenges of manual attendance

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monitoring, develop a digital solution, and evaluate its effectiveness. The respondents consisted of 35 faculty members, administrative staff, and students from The Great Plebeian College, selected through random sampling to capture diverse perspectives. Data collection involved survey questionnaires, real-time observation of system performance, and document analysis of historical attendance records. The research followed an iterative approach, continuously refining the system's features based on user feedback and technological advancements. Agile Software Development Life Cycle (SDLC) was used, ensuring incremental progress and collaboration. The methodology included requirements gathering through interviews, prototype design, feature development (e.g., attendance logging, data analysis, and report generation), comprehensive testing, and deployment with post-implementation monitoring.

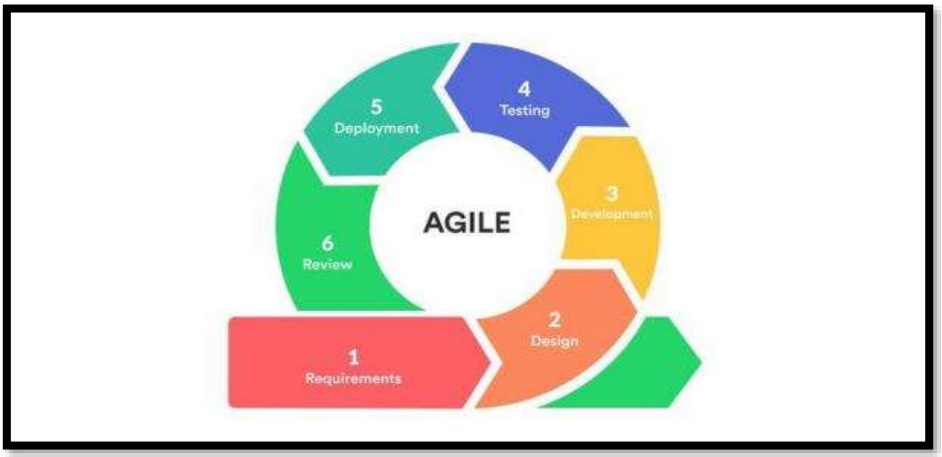

Fig. 1Agile Methodology with Respondent Distribution

The data presented in the table below, highlights the distribution of respondents who participated in the system evaluation. A total of 35 respondents were selected, comprising three faculty members (8.57%), thirty-one selected students (88.57%), and one IT expert (2.86%). The high percentage of student respondents reflects the system's primary user group, as students are the main individuals engaging with the attendance and computer monitoring system on a daily basis. Their feedback was essential in evaluating the usability, functionality, and user interface of the system. Faculty members, though a smaller proportion of respondents, provided valuable insights from an administrative and instructional perspective, particularly in terms of monitoring and report generation. Additionally, the inclusion of an IT expert, though only 2.86% of the total respondents, ensured that the technical design, performance, and security aspects of the system were evaluated objectively. This balanced mix of respondents contributed to a comprehensive assessment of the system from both end-user and technical viewpoints.

Table 1. Respondents of the Study

Respondents	**Number of Respondents**	**Percentage (%)**
Faculty Member	3	8.57%
Selected Students	31	88.57%
IT Expert	1	2.86%
Total Respondents	35	100%

To assess system effectiveness, weighted mean calculations were used, considering user satisfaction trends. Comparative analysis was conducted between manual and digital attendance monitoring systems to highlight efficiency improvements. A statistical approach was applied to analyze respondent validation during usability testing. A 5-point Likert Scale was used, where 5 signified Excellent and 1 indicated Poor. Responses were tabulated and interpreted using weighted mean calculations, ensuring a thorough usability and acceptability assessment.

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Table 2. Scale of Measurement for Acceptability Test

Scale	Statistical Limits	Rating	Descriptive Interpretation
4	3.26-4.00	Excellent	Highly efficient and comprehensive
3	2.51-3.25	Very Good	Functioning properly
2	1.76-2.50	Good	Limited but operational
1	1.00-1.75	Poor	Does not meet requirements

RESULTS AND DISCUSSIONS

The proposed attendance and computer monitoring system is designed using a three-tier architecture, a commonly adopted model that separates the application into three distinct layers: presentation, application, and data. The presentation tier serves as the system's user interface, allowing students to log in for attendance and access to laboratory computers, while administrators interact with the system to manage and monitor activities. It is responsible for displaying relevant information and collecting user inputs effectively. The application tier, also referred to as the logic or middle tier, is the core of the system. It processes the information collected from users, applies business logic, and manages how data is added, updated, or retrieved. Finally, the data tier serves as the storage component of the system, where all information such as login sessions, attendance records, and computer usage logs are securely stored and managed.

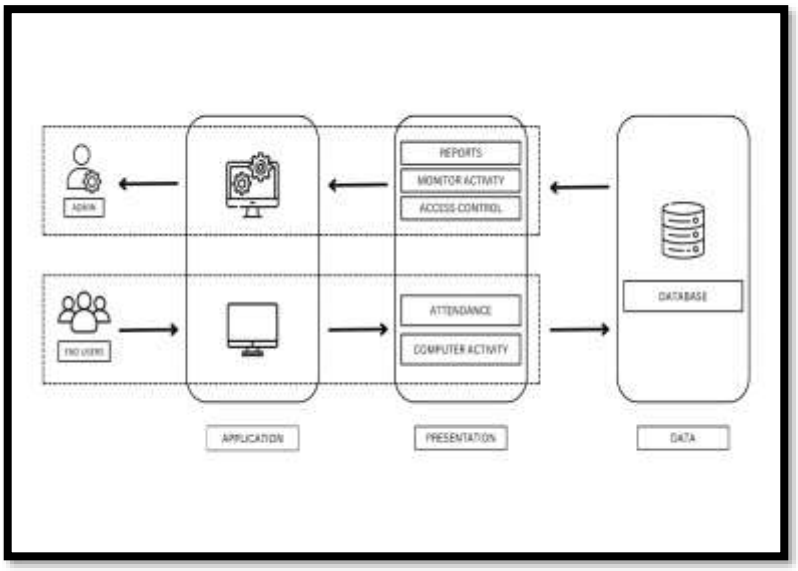

Figure 2.Attendance and Computer Monitoring System Architecture

As shown in the system architecture (Figure 2), the process begins when students enter the computer laboratory and log in using their credentials or RFID cards. This action triggers the system to verify the user and grant access to the assigned workstation. Simultaneously, the login data is recorded into a centralized database, allowing the administrator to monitor attendance logs and computer usage in real time. The admin has full access control over the laboratory system and can sort, filter, and generate reports based on specific criteria. This real-time access to data provides not only improved monitoring capabilities but also greater efficiency in generating accurate attendance records.

The traditional attendance system used at The Great Plebeian College presents several challenges. First, there is a significant human factor involved, as students manually write their names on paper-based attendance sheets upon entering the lab. This method often results in incomplete or incorrect entries, and there have been instances of students signing in on behalf of others. Additionally, instructors may become too preoccupied with teaching

duties and forget to take attendance, resulting in gaps or inconsistencies in the records. Second, the process is inefficient. Passing around attendance sheets during class consumes valuable time, and instructors must later encode the same data into digital systems. This double workload creates delays and increases the likelihood of errors, especially when verifying student attendance across multiple sessions. Third, the college's reliance on physical documentation introduces issues in record management. Paper records are stored in cabinets and folders, making them vulnerable to misplacement, disorganization, and difficulty in retrieval. These inefficiencies complicate administrative tasks and compromise the integrity of attendance tracking. Lastly, environmental factors such as dust, spills, or wear and tear further threaten the reliability of paper-based records. Any damage to these documents can render the data unreadable or permanently lost, making it difficult to maintain accurate archives.

To address these issues, the new system introduces a set of innovative features. Real-time monitoring enables continuous tracking of both attendance and computer usage, ensuring the integrity and timeliness of data. This eliminates the risk of false entries and delays associated with manual processes. The system also automates attendance logging by requiring students to authenticate via RFID before accessing any computer. This improves lab security and removes the need for instructors to manually collect and encode data. The attendance management feature securely stores all records in a centralized digital database, protecting the data from physical harm and simplifying retrieval for future use. Faculty can generate reports quickly, without sorting through stacks of paper or manually compiling data. Finally, the computer monitoring feature provides a secure and effective way to track all computer sessions. Each login is timestamped and linked to a verified user, ensuring accountability and preventing unauthorized access. The admin can also remotely monitor activity and intervene if needed. This system not only streamlines attendance tracking and lab access but also enhances the overall security and administrative efficiency of the college's computer laboratories.

REFERENCE

1. A review paper on Advanced Attendance and Monitoring Systems. (2021, August 7). *IEEE Conference Publication | IEEE Xplore*. Available: https://ieeexplore.ieee.org/abstract/document/9515249
2. Attendance monitoring system using fingerprint authentication. (2022, August 26). *IEEE Conference Publication | IEEE Xplore*. Available: https://ieeexplore.ieee.org/document/10010791
3. A fingerprint based smart attendance and security system using IoT and ultrasonic sensor. (2021, July 8). *IEEE Conference Publication | IEEE Xplore*. Available: https://ieeexplore.ieee.org/document/9528092
4. Ashok, S. H. V. K., Divya, N. D., Samuel, F., & Mande, U. (2022). RFID based attendance system. *International Journal for Research in Applied Science and Engineering Technology*, 10(12), 2239–2248. https://doi.org/10.22214/ijraset.2022.48092
5. Awotunde, J. B., Sur, S. N., Aderinto, M. T., & Gaber, T. (2023). RFID-Based Student Identification Card Attendance Monitoring System. In *Lecture Notes in Electrical Engineering* (pp. 31–41). https://doi.org/10.1007/978-981-99-1983-3_4
6. Ali, N. S., Alhilali, A. H., Rjeib, H. D., Alsharqi, H., & Sadawi, B. A. (2022). Automated attendance management systems: systematic literature review. *International Journal of Technology Enhanced Learning*, 14(1), 37. https://doi.org/10.1504/ijtel.2022.120559
7. Farag, W. (2023). An innovation in the development of a mobile radio model for a dual-band transceiver in wireless cellular communication. *An RFID-based Smart School Attendance and Monitoring System*, 1(1), 27–32. https://doi.org/10.54646/bijcicn.005
8. Biometric and RFID Passive Tag based Student Identification System for Secure Attendance Management. (2023, May 9). *IEEE Conference Publication | IEEE Xplore*. Available: https://ieeexplore.ieee.org/document/10166924
9. Chiem, Q., Huynh, K., Nguyễn, M. T., Tran, M., Nguyen, X. P., & Ly-Tu, N. (2021). Attendance monitoring using adjustable power UHF RFID and Web-Based Real-Time Automated Information System. In *Lecture Notes in Computer Science* (pp. 392–407). https://doi.org/10.1007/978-3-030-91387-825
10. Tran, M., Huynh, K., Pham, V., Phan, A., Nguyen, Q., Nguyen, X. P., & Ly-Tu, N. (2022). Performance analysis of automatic Integrated Long-Range RFID and webcam system. *SN Computer Science*, 3(6). https://doi.org/10.1007/s42979-022-01365-w