

The Effects of Reimplementing a Biometric Attendance Monitoring System in the Electronics Engineering Department at Don Honorio Ventura State University

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ABSTRACT: Monitoring the attendance of staff and employees holds paramount importance in organizational settings. This can be accomplished either manually, using logbooks and daily time records, or automatically through advanced technologies such as radio frequency identification, biometrics, and bar code scanners. Biometrics attendance monitoring systems, in particular, offer a range of benefits, including heightened security, accuracy, convenience, scalability, time efficiency, compliance, and accountability. This research paper elucidates the advantages of the biometric system, examining its impact on the employees of the Electronics Engineering Department at Don Honorio Ventura State University during the 1st Semester of the Academic Year 2023-2024. The Biometrics Attendance System proves to be exceptionally effective and efficient, gaining a consensus of 92% among participants regarding its positive impacts. Ratings consistently hover at 4 or 5 for efficiency, underscoring the streamlined processes. Accessibility earns a positive average score of 80%, and privacy measures receive an equally commendable average score of 82%. While the system generally contributes positively to managing absenteeism, an outlier score of 1 from a participant prompts further investigation. In conclusion, the Biometrics Attendance System excels in effectiveness, efficiency, and user satisfaction, positioning itself as a secure, accurate, and convenient solution. This becomes especially relevant as the Electronics Engineering Department integrates the biometric system, reaping benefits in terms of security, accuracy, and time efficiency. However, it's noteworthy that the implementation of the biometrics attendance system correlates with an increase in faculty absenteeism. Addressing specific concerns identified in the Manual Attendance System could guide targeted improvements for a more comprehensive and satisfactory attendance monitoring system overall.

KEYWORDS: Biometrics, Attendance Monitoring System, Finger Print

I. INTRODUCTION

Attendance monitoring of staff and employees is very crucial in every organization. It can be done manually through logbooks and daily time records or automatically through radio frequency identification, biometrics and bar code scanners. According to Syed (2018), biometric time attendance systems provide security, accuracy, convenience, scalability, time-saving, compliance and accountability. Being a business owner means to multitask all day long. Thus, keeping track of the employees' time and attendance should be the least concern. Every organization has to track employee time and attendance. Having stated that, many times people fail to choose the ideal time and attendance system. Because managing a business takes a lot of time, it can be difficult to stand back and consider the many

attendance systems available and their potential benefits (Timerack, 2021).

A key player in the advancement of many organizations is the computer. Hospitals, lodging facilities, department stores, airports, security firms, and particularly colleges are a few prominent examples (Ware, 2015). Numerous biometric systems are being developed that make use of hand geometry, facial traits, voiceprints, fingerprints, and ocular features, among other biometrics. These computer-based security systems are employed in a wide range of settings, including government, business, and civilian offices (Al-falluji, 2015).

Related Literature

A biometric attendance system is a time and attendance tracking system that identifies and tracks employees' attendance by using physical characteristics such as

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fingerprints, face or iris scans which is useful for tracking employee attendance, preventing time theft and improving security (Aratek, n.d.). An enhanced attendance monitoring system (EAMS) using biometric fingerprint recognition was designed and developed for Callang National High School in Isabela, Philippines. It was utilized to record the data of the employees, handle leave management, track and monitor employee attendance and encourage participation. The attendance rate of the first quarter of SY 2018-2019 was compared with the attendance rate of SY 2019-2020 and showed that the employees' late percentage was decreased and the employees' attendance had improved (Rivera, 2021). Another study was conducted by Maggay (2017) which included the design and development of a fully customized Biometric Attendance Monitoring System (BAMS) in Cagayan State University - Lasam Campus in the Philippines. The overall functionality of the BAMS enables the users to enter data, change and manipulate the data, get information, and store the data and the information which contributed to improving work values and achieving good governance of the employees. Challenges and acceptability of implementing a Biometric Attendance System (BAS) on secondary and higher secondary educational institutions in Jammu & Kashmir, India were presented in the study conducted by Kirmani (2017). The process of implementing BAS had been difficult since school employees were fond of the traditional book-based attendance system. BAS was gradually accepted by the employees through proper introduction and appropriate awareness of the technology and by addressing concerns such as feeling of insecurity and data privacy. Proper planning and availability of funds are determining factors to effectively implement BAS in Jammu & Kashmir. According to Mir et al. (2018), the biometric attendance system eliminates the concept of time theft, increases productivity, increases profits, minimizes labor costs and maximizes the benefits of customers. Because of data availability, it eliminates the poor tracking practices and creates a transparent and concrete audit trail for attendance and time records which improve accountability and transparency and enhance work culture of the employees.

Theoretical/Conceptual Framework

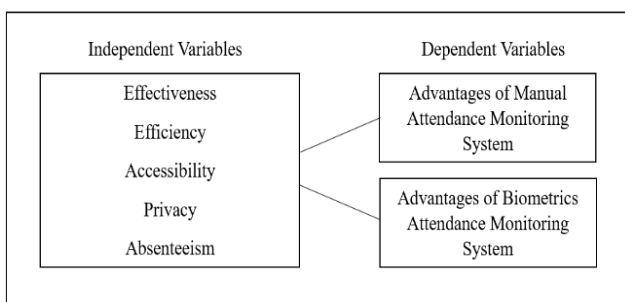


Figure 1. Dependent and Independent Variables

As seen in Figure 1, the dependent variables in the study are the advantages of manual and biometrics attendance

monitoring system in the Electronics Engineering (ECE) Department of Don Honorio Ventura State University (DHVSU) and the independent variables include effectiveness, efficiency, accessibility, privacy and absenteeism.

Scope and Limitations of the Study

The study was limited to the response on the survey form of the Faculty of DHVSU Electronics Engineering department. It identified the advantages of a biometric attendance monitoring system against the manual attendance monitoring system and determined the effects of BAS in the employees' attendance.

Significance of the Study

The study was important to see the effects of the reimplementation of the Biometrics Attendance Monitoring System after the pandemic. It presented the advantages Biometrics Attendance Monitoring System against the Manual Attendance Monitoring System

II. METHODS AND PROCEDURES

Research Design

The research design employs a mixed-methods approach, incorporating both qualitative and quantitative elements. Quantitative data is derived from the rating scores provided by participants, while qualitative data is obtained from open-ended feedback or comments.

Locale of the Study

The study is conducted in the Electronics Engineering Department of Don Honorio Ventura State University during the 1st Semester of the Academic Year 2023-2024.

Respondents

The respondents are the faculty members of the Electronics Engineering Department at Don Honorio Ventura State University, representing the overall population of the faculty. The number of participants is not explicitly stated, but it is the entire faculty population in the Electronics Engineering Department.

Sampling and Sampling Procedure

The sampling procedure involves the entire population of faculty members in the Electronics Engineering Department. This type of sampling is known as a census or complete enumeration, where every individual in the defined population is included.

Research Instruments

The research instruments include a mixed-methods approach. Quantitative data is collected through a structured rating system where participants provide scores on various aspects (effectiveness, efficiency, accessibility, privacy, and absenteeism). Qualitative data is collected through open-ended questions or comments, allowing participants to provide additional insights and comments beyond the numerical ratings.

Data Gathering Procedure

The data gathering procedure involves distributing the research instruments (questionnaires or surveys) to all faculty members in the Electronics Engineering Department. Participants provide both quantitative ratings and qualitative comments based on their experiences with the biometric attendance system.

Data Analysis Technique

The data analysis technique includes both quantitative and qualitative analysis. Descriptive statistics, such as averages and percentages, are used for the quantitative data. Qualitative data is analyzed through thematic analysis, identifying common themes or patterns in participants' open-ended responses.

III. RESULTS AND DISCUSSION

Part 1. Manual Attendance Monitoring System

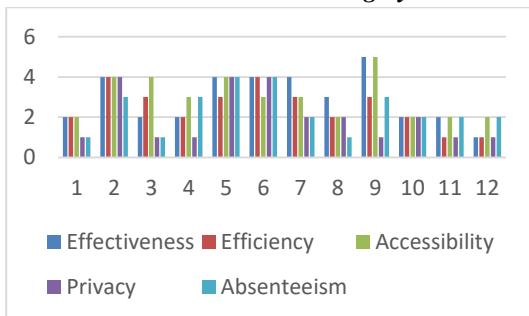


Figure 2. Survey Results on Manual Attendance Monitoring System

The Manual Attendance System, as seen in Figure 2, is perceived to have a moderately low level of effectiveness, with only 75% of participants providing ratings of 3 or 4 out of 5. This suggests a suboptimal effectiveness level, and the presence of variability in opinions, particularly a small subset (8%) expressing dissatisfaction with ratings of 1 out of 5, underscores potential critical areas that demand immediate attention and improvement.

Opinions on efficiency are predominantly negative, with a majority (42%) perceiving it at a mediocre level, rated only 3 out of 5. Adding to these concerns, a significant portion (25%) has expressed dissatisfaction, giving ratings of 2 or below, highlighting glaring inefficiencies that demand urgent investigation and rectification to salvage the system from its apparent lack of streamlined and resource-effective functionality.

Accessibility is generally perceived as subpar, with 67% of participants providing low ratings of 2 or 3 out of 5. This disappointing feedback is further accentuated by a notable subset (17%) expressing significant dissatisfaction with a rating of 1 out of 5. The specific challenges faced by this group become even more critical, signifying a dire need for targeted improvements to prevent further deterioration of accessibility and the overall user experience.

Privacy, while acknowledged, is perceived at a moderately low level, with 67% of participants assigning a mere 3 out of 5. A minority (8%) expressed slightly less dissatisfaction, offering ratings of 4 out of 5. However, understanding the factors contributing to this marginally higher satisfaction is imperative, as it represents a minor silver lining in an otherwise lackluster perception of privacy within the Manual Attendance System.

Low concerns about absenteeism are perhaps the sole positive note, with the majority of participants (42%) expressing minimal confidence with a rating of 1 out of 5. Nevertheless, the presence of some variability in perceptions, particularly 25% rating absenteeism as 2 or 3 out of 5, suggests underlying issues that could potentially impact user presence. Understanding the circumstances contributing to these perceptions is crucial for acknowledging and potentially mitigating the negative aspects of the attendance tracking system. In summary, the Manual Attendance System reveals a suboptimal performance across various dimensions, and addressing these specific concerns related to effectiveness, efficiency, accessibility, privacy, and absenteeism is paramount for preventing further degradation in user satisfaction and system functionality.

Part 2. Biometrics Attendance Monitoring System

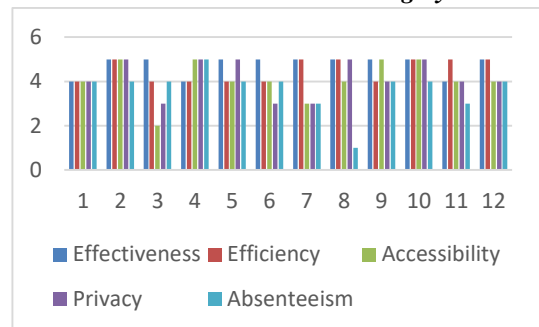


Figure 3. Survey Results on Biometrics Attendance Monitoring System

The Biometrics Attendance System, as seen in Figure 3, stands out as highly effective and efficient, with the majority of participants (92%) expressing a consensus on its positive impact, as indicated by ratings of 4 or 5 out of 5. This unanimity suggests a shared recognition of the system's success and positive outcomes. The high level of consensus is also observed in efficiency, with 92% of participants perceiving the system as highly streamlined and resource-effective. Notably, the ratings of 4 or 5 were consistent across all participants except one, prompting potential exploration into specific concerns or issues related to efficiency.

In terms of accessibility, the system received a generally positive average score of 80%, with the majority of participants providing scores of 4 or 5. However, the presence of variability, particularly a lower score of 2 from one participant, indicates a potential area of concern. Further exploration of this participant's feedback or additional

assessments may help identify specific accessibility issues that could be addressed to enhance the overall user experience.

Privacy measures associated with the Biometrics Attendance System are positively perceived, with an average privacy score of 82% and the majority of participants assigning scores of 4 or 5. Nonetheless, one participant expressing a lower score of 3 signals a potential privacy concern. Understanding the specific concerns raised by this participant would be crucial in guiding improvements to the privacy measures.

In terms of absenteeism, the system garnered a moderate average score of 70%, reflecting a mixed perception among participants. While the majority provided scores of 4 or 5, indicating a generally positive impact on attendance monitoring, one participant reported significantly lower absenteeism with a score of 1. The unique circumstances contributing to this outlier warrant exploration, as understanding this individual's feedback could provide valuable insights into factors influencing attendance.

In summary, the data presents a positive overall picture of the Biometrics Attendance System, showcasing high effectiveness and efficiency, positive perceptions of accessibility and privacy, with considerations for addressing variability, particularly in accessibility, and understanding unique circumstances contributing to an outlier in absenteeism. This information suggests areas that may benefit from further investigation or targeted improvements to enhance the overall performance and user satisfaction of the system.

IV. CONCLUSIONS

The Biometrics Attendance System emerges as a highly effective and efficient solution, as evidenced by overwhelmingly positive feedback from participants, with 92% rating it as highly effective and efficient. This underscores the system's success in accurately recording attendance and streamlining processes for both users and administrators. Moreover, user perception remains consistently positive, with the majority of participants providing scores of 4 or 5 across all criteria, indicative of a robust and reliable system experience for a diverse user base. The positive privacy perception, averaging at 82%, highlights the general trust users place in the system's privacy measures, contributing to an overall positive user experience. Acknowledging a moderate absenteeism score of 70%, it becomes evident that absenteeism is likely a result of user choices rather than system-related issues. This reinforces the system's effectiveness in capturing attendance data, with user decisions influencing reported absenteeism rates. Furthermore, while the average accessibility score is positive at 80%, addressing specific challenges faced by a subset of users providing lower scores could further enhance the overall accessibility of the system. In conclusion, the Biometrics Attendance System demonstrates significant

advantages, particularly in effectiveness, efficiency, and privacy, and improvements in accessibility can contribute to an even more refined user experience.

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