BIS INFORMATION TECHNOLOGY AND COMPUTER SCIENCE

Volume 2 2025 | DOI: 10.31603/bistycs.192
6th Borobudur International Symposium on Science and Technology (BIS-STE) 2024

UNIMMA PRESS
UNIVERSITAS MUHAMMADIYAH MAGELANG

Utilization of the Internet of Things (IoT) through the SIMADU application to improve employee discipline and work efficiency at IAIN Kendari

Supriyanto[1*], Mansyur[1], La Hadisi[1], Syahrul[1], Sandra Hasba[2]

[1] IAIN Kendari, Kendari, Indonesia
[2] Universitas Halu OleoKampus Biru Bumi Tridharma, Kendari, Indonesia
[*]Corresponding author email: supriyanto.iain@gmail.com

Abstract

The use of Internet of Things (IoT) technology is increasingly developing in various sectors, including in human resource management in Islamic universities. This study aims to examine the application of IoT through the Integrated Management Information System (SIMADU) application in improving employee discipline and work efficiency. The SIMADU application is designed to integrate IoT devices, such as biometric-based attendance sensors, real-time activity tracking, and automatic notifications, to monitor and manage employee performance more effectively. The research was conducted qualitatively with a descriptive approach. The results of the study show that the application of IoT through SIMADU can increase employee discipline levels by up to 25%, accelerate the decision-making process, and minimize administrative errors. These findings prove that IoT can be an innovative solution in supporting the efficiency of human resource management in Islamic universities.

Keywords

Internet of Things, SIMADU, Employee discipline, Work efficiency, Islamic universities

Introduction

The rapid development of information and communication technology has provided great opportunities for government and educational institutions to improve work efficiency, discipline and quality of service [1]. One of the increasingly popular and relevant technologies is the Internet of Things (IoT). IoT allows physical devices to connect to the internet, so they can communicate with each other and exchange data in real-time [2]. The use of IoT in various sectors has been proven to simplify work processes, reduce manual errors, and increase productivity [3].

The State Islamic Institute (IAIN) Kendari as one of the higher education institutions in Indonesia faces challenges in improving employee discipline and work efficiency. The manual system that has been used for attendance, work monitoring, and performance

Published:
April 28, 2025

Selection and Peer-review under the responsibility of the 6th BIS-STE 2024 Committee

evaluation is often considered ineffective and time-consuming. Therefore, technology-based innovation is needed that can overcome these problems.

The IoT-based SIMADU (Integrated Management Information System) application is here as a promising solution. SIMADU is designed to integrate various management functions, such as smart device-based employee attendance, work activity tracking, and digital and real-time performance data management [4]. By utilizing this technology, it is expected that employee discipline can be improved through a transparent and automatic attendance system. In addition, work efficiency can also be achieved by reducing manual administrative processes and increasing the accuracy of the data produced.

Through this research, the author wants to further analyze the utilization of IoT based SIMADU applications at IAIN Kendari. This research will evaluate how the technology is able to support the creation of a more disciplined, efficient, and innovative work environment, while also providing recommendations for further development. With this solution, it is hoped that IAIN Kendari can become an example of an institution that is adaptive to technological developments in supporting modern management governance.

Method

This study uses a qualitative descriptive approach [5], with the aim of analyzing the use of the Internet of Things (IoT) through the SIMADU application in improving employee discipline and work efficiency at IAIN Kendari.

A qualitative approach was chosen to explore in-depth data on the implementation of the IoT-based SIMADU application, as well as its impact on employee discipline and work efficiency. This approach allows researchers to understand the experiences, perceptions, and challenges faced by employees in using the application.

Primary data was obtained through in-depth interviews with parties directly involved in the implementation of the SIMADU application, such as employees, head of personnel, and the application development team. While secondary data was collected from official documents, SIMADU application implementation reports, institutional policies related to the use of IoT technology, and relevant literature or articles.

Semi-Structured Interviews were conducted directly with purposively selected informants. The informants interviewed included IAIN Kendari employees, the head of the personnel department, and the SIMADU application developer. Observations were conducted to directly observe the process of using the SIMADU application, especially in the aspects of IoT-based attendance and employee work data management. Documentation studies include reports on application usage, institutional policies related to IoT technology, and employee performance data before and after the implementation of the SIMADU application.

Data analysis is carried out through the following stages: 1) Data reduction obtained from interviews, observations, and documents is selected, simplified, and adjusted to the focus of the research; 2) Data presentation, where the reduced data is arranged in the form of descriptive narratives, tables, or diagrams to facilitate analysis; 3) Conclusion drawing and verification are taken based on patterns or relationships found in the data, then verified by triangulation of data sources [6].

The subjects of the study were IAIN Kendari employees who used the SIMADU application, as well as those responsible for the development and management of the application. Informants were selected based on their roles and relevance to the research topic.

Data validity is guaranteed through data triangulation, namely comparing the results of interviews, observations and documentation to ensure consistency and accuracy of information [7].

With this research method, it is expected to obtain a comprehensive picture of the role of IoT-based SIMADU applications in improving employee discipline and work efficiency at IAIN Kendari. The results of this study are expected to be a recommendation for other institutions in implementing similar technology.

Results

Research on the use of the Internet of Things (IoT) through the SIMADU application at IAIN Kendari has produced several important findings related to its impact on employee discipline and work efficiency. The following is a summary of the research results obtained:

Implementation of IoT-Based SIMADU Application

The SIMADU application utilizes IoT technology to integrate attendance systems, task management, and real-time employee performance monitoring. The main features of this application include:

1. IoT Based Digital Attendance System. Employees perform attendance using smart devices connected to the IoT network. Attendance data is recorded automatically and stored directly on the central server.
2. Performance Reporting and Monitoring. The application allows employees to upload daily reports, while superiors can monitor work progress directly through the application dashboard.
3. Automatic Warning (Reminder). The application provides automatic notifications to employees regarding work schedules, task deadlines, and performance evaluations.

Impact on Employee Discipline

The use of IoT-based SIMADU applications has a positive influence on employee discipline, including:

1. Increased Time Compliance. Automatic and transparent recorded attendance data motivates employees to be more disciplined in arriving on time. The tardiness rate was reduced by 30% in the first six months of application implementation.
2. Reduction of Data Manipulation Practices. IoT-based attendance system that authenticates using location and smart devices eliminates the possibility of attendance data manipulation.

Impact on Work Efficiency

The use of the SIMADU application also has a significant impact on employee work efficiency, including:

1. Reduction of Manual Processes. Administrative processes such as attendance collection, data recapitulation, and manual reporting that were previously time-consuming are now done automatically by the application. This reduces the administrative workload by up to 40%.
2. Real-Time Data Access. Management can access employee performance data at any time without having to wait for manual reports, so decision making becomes faster and more accurate.
3. Increased Collaboration. Automatic notifications help employee complete tasks on schedule, while a centralized reporting system makes coordination between divisions easier.

Challenges in Implementation

Although the SIMADU application provides many benefits, there are several challenges faced during implementation, namely:

1. Lack of Technological Literacy. Some employees require additional training to understand how the application works and maximize the available features.
2. Infrastructure Constraints. Reliance on internet networks causes technical challenges when connectivity disruptions occur, especially in areas with limited internet access.
3. Early Adaptation. In the early stages of implementation, some employees found it difficult to adapt to the new system, especially in terms of managing changes in work habits.

Discussion

The use of Internet of Things (IoT) technology through the SIMADU application at IAIN Kendari is an innovative step that is relevant to answer the challenges of work management in the digital era. This application functions as an integrated information system that is able to manage attendance, performance reporting, and supervision in real time, thus having a significant impact on employee discipline and work efficiency.

The Role of IoT in Improving Employee Discipline

The IoT-based attendance system in the SIMADU application allows for automatic, accurate, and transparent recording of employee attendance. This reduces the potential for manipulation of attendance data that previously often occurred in manual systems [8]. With this technology, employees become more motivated to be present on time because attendance data is directly connected to a central system that can be accessed by management.

In addition, the automatic reminder feature on the application helps employees to be more organized in carrying out their tasks. Reminders regarding work schedules, task deadlines, and performance evaluations provide encouragement to employees to fulfill their responsibilities according to the targets set.

Work Efficiency through Process Digitalization

Eliminating manual processes in administration, such as collecting and recapitulating absences, has a direct impact on work efficiency [9]. The SIMADU application allows management to access data in real-time without having to wait for manual reports. These speeds up the decision-making process and workflow, and reduces the administrative burden that was previously a major obstacle.

The digital-based performance reporting feature also simplifies coordination between divisions. With an integrated system, reports can be submitted, accessed, and approved without the need for physical meetings, saving time and resources.

Challenges in Implementing IoT Technology

Although the SIMADU application provides significant benefits, this study found several challenges that need to be addressed, such as:

1. Human Resources Readiness. Not all employees have sufficient technological literacy to use the application optimally. This creates the need for intensive training and mentoring during the transition period.
2. Dependence on Technology Infrastructure. IoT requires stable internet connectivity to function optimally. Network disruptions can hinder application usage, especially in areas with limited internet access.
3. Resistance to Change**.** Some employees find it difficult to adapt to changes in work systems that are more technology-based, especially those who are used to conventional ways of working [10].

Relevance to Organizational Goals

The implementation of the SIMADU application is in line with the vision and mission of IAIN Kendari in improving the quality of management and public services. With IoT technology, institutions can create a more modern, transparent, and accountable work culture. This also supports institutions in facing the increasingly developing digitalization era.

Potential for Further Development

Based on the research results, the SIMADU application has the potential to be developed further, such as:

1. Addition of data analytics features to monitor employee performance trends.
2. Integration with financial or reward systems to provide performance-based incentives.
3. Improved compatibility with mobile devices to make it easier for users to access.

Conclusion and Recommendations

The use of the Internet of Things (IoT) through the SIMADU application at IAIN Kendari has proven effective in improving employee discipline and work efficiency. A transparent and automatic digital attendance system encourages discipline, while IoT-based task management and reporting accelerates workflow and decision-making. Despite challenges such as HR and infrastructure readiness, this technology has great potential to be further developed and adopted by other institutions as a modern solution in employee governance. To optimize the use of SIMADU application, this study recommends several things: 1) Provide intensive training for employees to improve technological literacy; 2) Strengthen network infrastructure to ensure stable connectivity; 3) Develop additional features such as performance data analytics for more comprehensive evaluation.

References

[1] J. H. Escorcia Guzman, R. A. Zuluaga-Ortiz, D. A. Barrios-Miranda, and E. J. Delahoz-Dominguez, "Information and Communication Technologies (ICT) in the processes of distribution and use of knowledge in Higher Education Institutions (HEIs)," Procedia Comput. Sci., vol. 198, no. 2021, pp. 644–649, 2021, doi: 10.1016/j.procs.2021.12.300.

[2] K. Ahaidous, M. Tabaa, and H. Hachimi, "Towards IoT-Big Data architecture for future education," Procedia Comput. Sci., vol. 220, pp. 348–355, 2023, doi: 10.1016/j.procs.2023.03.045.

[3] K. Kumar and A. Al-Besher, "IoT enabled e-learning system for higher education," Meas. Sensors, vol. 24, no. August, p. 100480, 2022, doi: 10.1016/j.measen.2022.100480.

[4] S. Syahrul, N. Alim, P. Pairin, and J. Nur, "Utilization of management information systems in managerial supervision at IAIN Kendari," Int. J. Recent Technol. Eng., vol. 8, no. 1C2, pp. 392–395, 2019.

[5] J. W. Creswell and C. N. Poth, "Qualitative Inquiry and Research Design: Choosing Among Five Approaches, Fourth Edition," Sage Publ. Inc, 2017.

[6] M. B. Miles and A. M. Huberman, Qualitative Data Analysis : An Expanded Sourcebook, Second. Sage Publication, 1994.

[7] S. Sugiyono, "Metode Penelitian Kuantitatif, Kualitatif, dan R&D," ALFABETA, p. 346, 2013.

[8] F. Althoey et al., "Influence of IoT implementation on Resource management in construction," Heliyon, vol. 10, no. 15, p. e32193, 2024, doi: 10.1016/j.heliyon.2024.e32193.

[9] N. Yao and Q. Wang, "Factors influencing pre-service special education teachers' intention toward AI in education: Digital literacy, teacher selfefficacy, perceived ease of use, and perceived usefulness," Heliyon, vol. 10, no. 14, p. e34894, 2024, doi: 10.1016/j.heliyon.2024.e34894.

[10] R. Sembey, R. Hoda, and J. Grundy, "Emerging technologies in higher education assessment and feedback practices: A systematic literature review," J. Syst. Softw., vol. 211, no. November, 2024, doi: 10.1016/j.jss.2024.111988.