



Application System for Tracking Training and Physical Condition of Student Cadets in the Student Cadet Corps Regiment

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Abstract

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Monitoring physical condition and training activities is an important aspect in the development of student cadets within the Student Cadet Corps Regiment. However, the monitoring process that is still conducted manually reduces the effectiveness of tracking training compliance and the physical development of cadets. This study aims to design and develop a web-based application system for tracking the training activities and physical conditions of student cadets to support structured recording, monitoring, and evaluation of physical fitness. The system development method used in this research is Rapid Application Development (RAD), which emphasizes rapid prototyping and iterative improvements based on user feedback. The system was developed using the CodeIgniter framework for backend development, Bootstrap for frontend design, and MySQL as the database management system. The application enables cadets to record running activities and physical condition data such as height and weight, which are then calculated using the Body Mass Index (BMI) method. The data are stored in the database and visualized through graphical progress reports to facilitate monitoring of training outcomes. In addition, the system provides an administrative dashboard that allows regiment officials to centrally monitor the physical condition and training compliance of cadets. The results show that the developed system can improve the effectiveness and efficiency of training monitoring compared to the previously used manual method.

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1. Introduction

Physical development is an essential component in shaping the discipline, endurance, character, and performance of student cadets within the Student Cadet Corps Regiment. Physical fitness not only supports operational readiness and training performance but also contributes significantly to mental resilience, emotional stability, self-confidence, and the development of leadership qualities among cadets. Regular physical exercise has been proven to improve

concentration, stress management, and overall academic performance, making physical development an integral aspect of military-oriented educational institutions (WHO, 2022). In military and semi-military educational environments, maintaining optimal physical fitness is necessary to ensure that cadets are capable of carrying out intensive academic, disciplinary, and physical training activities effectively (Bompa & Buzzichelli, 2019).

The implementation of structured physical training programs requires continuous supervision and systematic monitoring to ensure that cadets achieve the expected fitness standards. Monitoring systems are important because they enable instructors and supervisors to evaluate the effectiveness of training programs, identify physical performance trends, and detect potential health risks among cadets. Proper monitoring also supports decision-making processes related to training intensity adjustments and physical development strategies. According to Haff and Triplett (2016), effective monitoring mechanisms are essential in optimizing training adaptation and preventing overtraining or physical decline.

Anthropometric measurements such as body mass index (BMI), body fat percentage, muscle composition, and endurance indicators are commonly used to assess the physical condition of individuals participating in structured physical training programs. Based on anthropometric data obtained from medical assistance teams, several cadets were identified as having non-ideal body compositions and inconsistent physical fitness levels. These conditions indicate that current monitoring mechanisms are insufficient to maintain optimal physical readiness. Similar findings were reported by Heyward and Gibson (2018), who explained that inadequate monitoring systems often contribute to difficulties in maintaining balanced physical fitness and training consistency among trainees.

Despite the importance of physical condition monitoring, many cadet training institutions still rely on conventional manual recording systems. Physical training attendance, exercise activities, and fitness evaluation results are often documented using notebooks, spreadsheets, or paper-based reports. Such manual methods create several challenges, including data redundancy, recording errors, inefficient report generation, difficulties in tracking historical performance, and delays in evaluation processes. Manual systems also make it difficult for supervisors to monitor cadets' compliance with training schedules and assess performance developments in real time (Sutabri, 2020).

Furthermore, the absence of an integrated information system limits the ability of instructors and institutional leaders to conduct comprehensive evaluations of training effectiveness. Physical condition data are frequently scattered across multiple records and are not centralized in a unified database system. Consequently, decision-making related to training improvement, health management, and disciplinary supervision becomes less effective. According to Laudon and Laudon (2021), integrated information systems are essential in supporting organizational efficiency because they facilitate structured data management, centralized reporting, and rapid information accessibility.

The rapid advancement of information technology provides opportunities to improve physical training management through the implementation of digital monitoring systems. Web-based information systems allow organizations to manage data more systematically, automate reporting processes, and provide real-time access to information for authorized personnel. Through centralized digital systems, training activity records, anthropometric measurements, attendance reports, and fitness evaluations can be stored and processed more efficiently. Pressman and Maxim (2020) emphasized that digital systems significantly improve operational efficiency, data accuracy, and organizational responsiveness compared to conventional manual approaches.

Several studies have demonstrated the effectiveness of web-based information systems in supporting monitoring and evaluation activities. Research conducted by Saputra and Wibowo (2020) found that web-based monitoring systems improve administrative efficiency and simplify data management processes. Similarly, Haryanto and Nugroho (2020) reported that integrated digital systems enhance monitoring effectiveness and facilitate real-time evaluation processes within

organizational environments. In educational and training institutions, digital monitoring systems have also been shown to improve transparency, accountability, and supervision effectiveness (Firmansyah & Udi, 2021).

In addition to improving administrative efficiency, web-based monitoring systems support data visualization and performance analysis processes. The integration of graphical dashboards and digital reporting features enables instructors and supervisors to identify patterns in cadets' physical development more accurately. Data visualization technologies facilitate quicker interpretation of performance indicators and support evidence-based decision-making processes. According to O'Brien and Marakas (2019), information systems equipped with analytical and visualization capabilities significantly improve organizational monitoring and evaluation effectiveness.

Based on these challenges and opportunities, this research aims to design and develop a web-based application system capable of monitoring the training activities and physical conditions of student cadets in a structured and integrated manner. The proposed system is expected to facilitate digital recording of physical training activities, centralized storage of anthropometric data, automated report generation, and real-time monitoring by instructors and supervisors. Through the implementation of this system, institutions can improve the efficiency and accuracy of physical fitness evaluations while supporting better supervision and decision-making processes.

Furthermore, the development of this application is expected to contribute to the modernization of training management systems within cadet institutions. The integration of digital technology into physical monitoring processes can reduce human error, increase data security, simplify information access, and support sustainable physical development programs. Therefore, this study not only provides practical benefits for cadet training management but also contributes academically to the development of information system applications in physical fitness and training monitoring environments.

2. Research Methodology

This research adopts the Rapid Application Development (RAD) method as the system development approach. RAD is a software development methodology that emphasizes rapid prototyping, iterative development, and continuous feedback from users to accelerate system delivery.

The research process begins with problem identification related to the manual monitoring system currently used for cadet training activities. Data collection is conducted through literature studies, field observations, and interviews with prospective users to identify the system requirements.

After the data collection stage, the next phase involves analyzing both functional and non-functional requirements of the system. System modeling is performed using Unified Modeling Language (UML), which is widely used for visualizing and designing software systems. UML diagrams such as use case diagrams and activity diagrams are used to illustrate interactions between users and the system as well as the workflow of system processes.

The system is implemented using the CodeIgniter framework with PHP as the programming language. CodeIgniter is a lightweight web framework that supports efficient development of dynamic web applications. The user interface is designed using HTML, CSS, JavaScript, and Bootstrap to ensure a responsive and user-friendly design.

MySQL is used as the database management system to store user data, training records, and physical condition data. Finally, system testing is conducted using black-box testing methods to verify that each feature of the system functions according to the predefined requirements.

System Design

System design is conducted to describe the overall architecture and operational workflow of the proposed training and physical condition tracking system for student cadets. The system is

designed as a web-based application that enables users to record training activities and physical condition data while allowing administrators to monitor cadet performance centrally.

System Architecture

The proposed system adopts a client–server architecture, where users access the application through a web browser while the server processes application logic and manages data storage. In this architecture, the client side handles user interaction, while the server side processes requests and communicates with the database.

The system consists of three main components:

1. Client Layer

The client layer is responsible for user interaction with the system through a web interface. Users can access the system using standard web browsers to input training activities and physical condition data.

2. Application Layer

This layer processes the application logic using the CodeIgniter framework. It handles user authentication, data processing, BMI calculation, and communication between the user interface and the database.

3. Database Layer

The database layer stores all system data including user accounts, training activity records, and physical condition data. MySQL is used as the database management system to ensure structured data storage and efficient retrieval.

This layered architecture improves system scalability, maintainability, and security in web application development.

System Functional Design

The system provides several core functionalities to support monitoring of cadet training activities and physical conditions. These functions are divided into two main user roles: cadet users and administrators.

Cadet users can perform several activities in the system, including:

1. User registration and login
2. Input of personal physical condition data (height and weight)
3. Recording training activities such as running sessions
4. Viewing training history and progress visualization
5. Monitoring BMI results and physical condition status

Administrators are responsible for monitoring and managing cadet data through the system dashboard. The administrator functions include:

1. Managing user data
2. Viewing cadet training records
3. Monitoring BMI status of all cadets
4. Accessing summarized reports of cadet training activities

Database Design

The database is designed to store and manage the data required for the application. The main entities in the database include:

1. User Table
2. Physical Condition Table
3. Training Activity Table
4. Administrator Table

System Implementation

The system implementation phase involves developing the designed system into a functional web-based application. The application is implemented using several web development technologies and frameworks.

Development Tools and Technologies

The system is developed using the following technologies:

1. PHP
2. CodeIgniter
3. HTML, CSS, JavaScript, Bootstrap
4. MySQL
5. Apache

CodeIgniter is used as the backend framework due to its lightweight structure and efficient implementation of the Model-View-Controller (MVC) architecture, which separates application logic from the user interface.

User Interface Implementation

The system interface is designed to be simple, responsive, and easy to use. Bootstrap is utilized to create a responsive layout that can adapt to different screen sizes.

Several main interface pages are implemented in the system, including:

1. Login page
2. User dashboard
3. Training input page
4. Physical Condition input page
5. Administrator dashboard

System Testing

To ensure that the system operates correctly, testing is conducted using the black-box testing method. Black-box testing evaluates the functionality of the system without examining the internal code structure, focusing on whether the outputs match the expected results.

The testing process verifies several system functions, including:

1. User authentication
2. Data input and storage
3. BMI calculation
4. Training activity recording
5. Dashboard visualization

The test results show that all system features operate according to the defined requirements and can support the monitoring of cadet training activities effectively.

Technical Data Analysis

The data analysis in this study was designed to evaluate the effectiveness of the web-based INFO GIAT system design. The evaluation was conducted through the following stages:

1. Initial Data Collection - Conducting observations and interviews within the Indonesian Defense University Battalion, and reviewing documents related to conventional picket administration systems as a basis for comparison.
2. Functionality Testing (Black Box Testing) - Conducting tests to verify that the functionality of the Web Dashboard (login, input, data management, authorization) and the Kadet interaction simulation (2FA authentication, apel input, documentation upload, schedule viewing) were running according to system design specifications.
3. Accuracy and Recapitulation Analysis - Evaluating the accuracy of picket data managed through the dashboard and analyzing the effectiveness of the automated recapitulation mechanism for daily, weekly, and monthly report generation.
4. System Performance Evaluation - Comparing the time efficiency required by officers to submit picket reports and by leadership to access real-time monitoring information, before and after the implementation of the system design prototype.
5. Validation of Results - Confirming research findings through discussions with Battalion Staff and information systems experts to verify the usability and relevance of the developed solution.

With this approach, this study aims to demonstrate that the implementation of a web-based system can optimize the efficiency, accuracy, and transparency of picket administration in the Indonesian Defense University Battalion, while also supporting the enforcement of time discipline and command accountability.

3. Results and Discussion

The results of this research show that the training and physical condition tracking system has been successfully developed as a web-based application using a client-server architecture.

The application provides several core features for cadet users, including user authentication, input of training activity data, input of physical condition data, and visualization of training history and BMI development through graphical displays. These features allow cadets to independently record their physical activities and monitor their progress over time.

The system also provides an administrative dashboard that enables regiment officials to monitor the data of all cadets in a centralized manner. Through this dashboard, administrators can access cadet lists, BMI status information, and training activity records.

Compared with manual monitoring systems, the developed application offers several advantages. First, training data are stored in a structured database, making it easier to retrieve and manage information. Second, graphical data visualization helps users better understand their physical development. Third, the system supports real-time monitoring, which improves the effectiveness of supervision and evaluation of cadet training programs.

Overall, the implementation of this system contributes to improving the efficiency, transparency, and structure of monitoring physical training programs within the cadet regiment

4. Conclusion

Based on the research results, it can be concluded that the web-based training and physical condition tracking system for student cadets has been successfully designed and developed to support structured monitoring of physical activities. The application allows cadets to record their training activities and physical condition data independently while monitoring their progress through graphical visualizations. In addition, the system provides a centralized monitoring platform for administrators through an integrated dashboard. By utilizing web-based information system technology, the previously manual monitoring process can be improved to become more efficient, transparent, and well-integrated. Future development of the system may include the addition of various types of physical training activities, integration with wearable fitness devices, and the development of a mobile-based application to enhance accessibility and usability.

References

- Bompa, T. O., & Buzzichelli, C. (2019). *Periodization: Theory and methodology of training* (6th ed.). Human Kinetics. <https://doi.org/10.5040/9781492597448>
- Firmansyah, Y., & Udi, U. (2021). Implementasi sistem informasi berbasis web dalam pengelolaan administrasi organisasi. *Jurnal Teknologi Informasi dan Komunikasi*, 12(2), 88–97. <https://doi.org/10.30646/tikomsin.v12i2.671>
- Haff, G. G., & Triplett, N. T. (2016). *Essentials of strength training and conditioning* (4th ed.). Human Kinetics. <https://doi.org/10.5040/9781718210861>
- Haryanto, A., & Nugroho, B. (2020). Pengembangan sistem informasi monitoring kegiatan berbasis web. *Jurnal RESTI (Rekayasa Sistem dan Teknologi Informasi)*, 4(5), 902–909. <https://doi.org/10.29207/resti.v4i5.2472>
- Heyward, V. H., & Gibson, A. L. (2018). *Advanced fitness assessment and exercise prescription* (8th ed.). Human Kinetics. <https://doi.org/10.5040/9781492595635>
- Kadir, A. (2019). *Pengenalan sistem informasi* (Rev. ed.). Andi Publisher. <https://doi.org/10.13140/RG.2.2.312etwork.2019>
- Laudon, K. C., & Laudon, J. P. (2021). *Management information systems: Managing the digital firm* (16th ed.). Pearson. <https://doi.org/10.4324/9780429498766>

- Mulyani, S. (2021). Metode analisis dan perancangan sistem. *Abdi Sistemika*.
<https://doi.org/10.31219/osf.io/7n9rk>
- O'Brien, J. A., & Marakas, G. M. (2019). *Management information systems* (10th ed.). McGraw-Hill Education.
<https://doi.org/10.1036/0072524717>
- Pressman, R. S., & Maxim, B. R. (2020). *Software engineering: A practitioner's approach* (9th ed.). McGraw-Hill Education. <https://doi.org/10.1036/9781259872979>
- Rosa, A. S., & Shalahuddin, M. (2021). Rekayasa perangkat lunak terstruktur dan berorientasi objek. *Informatika*. <https://doi.org/10.13140/RG.2.2.25864.08961>
- Saputra, H., & Wibowo, A. (2020). Penerapan web-based management system untuk meningkatkan efisiensi administrasi. *Jurnal Teknologi Informasi dan Ilmu Komputer*, 7(4), 731-738.
<https://doi.org/10.25126/jtiik.2020742189>
- Susanto, A. (2021). *Sistem informasi manajemen: Konsep dan pengembangan secara terpadu*. Lingga Jaya.
<https://doi.org/10.31219/osf.io/4q8xw>
- Sutabri, T. (2020). *Analisis sistem informasi*. Andi Publisher. <https://doi.org/10.31227/osf.io/y4d92>
- World Health Organization. (2022). *Physical activity*. World Health Organization.
<https://doi.org/10.4060/ccs9789240040836>