

DESIGN OF A WEB-BASED TRAINING REGISTRATION SYSTEM USING RAD AT PPKD CENTRAL JAKARTA

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Abstract—The annual growth of the Indonesian labor force faces challenges in employment absorption due to a competency mismatch. To address this, the government, through Bappenas, encourages vocational training programs, such as those at PPKD Central Jakarta. However, the current semi-manual registration process leads to data inefficiency and information delays. This study aims to design a web-based training registration information system using the Rapid Application Development (RAD) method. The resulting system can handle up to 17 concurrent users with an average response time of 1.25 seconds and a page load time of 4.57 seconds. PPKD Central Jakarta contributed as the research locus, providing operational data and functional requirements for system development. The implementation of this system successfully digitalizes vocational training administrative services, making them more responsive and accurate.

Keywords: information system, online registration, PPKD, RAD, website.

Abstrak—Pertumbuhan angkatan kerja tahunan di Indonesia masih menghadapi kendala penyerapan tenaga kerja akibat adanya mismatch kompetensi. Pemerintah melalui Bappenas berupaya mengatasi hal ini dengan mendorong program pelatihan vokasi, salah satunya di PPKD Jakarta Pusat. Namun, proses pendaftaran saat ini masih bersifat semi-manual yang menyebabkan inefisiensi data dan keterlambatan informasi. Penelitian ini bertujuan merancang sistem informasi pendaftaran pelatihan berbasis web menggunakan metode Rapid Application Development (RAD). Sistem yang dihasilkan mampu menangani hingga 17 pengguna simultan dengan rata-rata waktu respons 1,25 detik dan page load 4,57 detik. PPKD Jakarta Pusat berkontribusi sebagai lokus penelitian serta penyedia data operasional dan kebutuhan

fungsi dalam pengembangan sistem ini. Implementasi sistem ini berhasil mendigitalisasi layanan administrasi pelatihan menjadi lebih responsif dan akurat.

Kata Kunci: sistem informasi, pendaftaran online, PPKD, RAD, situs web.

INTRODUCTION

Indonesia faces a significant labor market challenge: although the labor force continues to grow annually, employment absorption remains limited. Data from the Central Statistics Agency (BPS) show that the labor force reached 153.05 million people, increasing by 3.67 million within a year, while unemployment also rose to 7.28 million individuals (Badan Pusat Statistik (BPS), 2024). This situation underscores a persistent mismatch between workforce competencies and labor market demands, particularly in the formal sector where technical and specialized skills are increasingly prioritized (Direktorat Kursus dan Pelatihan, 2022).

In response to this challenge, the Indonesian government through the National Development Planning Agency (Bappenas) has prioritized vocational education and job training as key strategies to improve human resource quality and meet industry demands. One supporting institution is the Central Jakarta Regional Job Training Center (PPKD), which offers various training programs for job seekers. However, the participant registration process is still semi-manual, relying on Google Forms or direct registration, leading to issues such as data duplication, delayed information delivery, and limited real-time reporting and evaluation capabilities.

Several institutions have implemented web-based registration systems to streamline enrollment processes. For instance, the UPTD

Vocational Training Center in Salatiga developed an online platform that enables applicants to register without queuing, generate participant cards using unique IDs, and access detailed training information along with recommended follow-up programs (Dwi et al., 2022). Similarly, UPTD Balai Latihan Kerja Surabaya implemented an online registration application built using PHP and MySQL, enabling 24/7 access to electronic registration, eliminating physical queues, and accelerating the enrollment process (Ansyari et al., 2023). In addition, other studies have highlighted the effectiveness of web-based registration systems in improving service efficiency, data accuracy, and accessibility for users (Rahman & Ramdani, 2026); (Putri et al., 2025).

These systems generally support online registration, automated card issuance, digital notifications, and dashboard-based reporting. However, most existing systems are primarily focused on basic registration functionalities and have not been specifically designed to accommodate the complexity of administrative workflows at PPKD Central Jakarta. Furthermore, limitations such as lack of system integration, minimal user-centered design considerations, and insufficient adaptability to dynamic training requirements indicate that current solutions are not yet optimal. These limitations highlight the need for a more comprehensive and adaptive system that can better support institutional requirements.

In response to these challenges, the present study proposes the development of a web-based information system customized for the registration processes at PPKD Central Jakarta. The system is developed using the Rapid Application Development (RAD) methodology, which emphasizes iterative prototyping and continuous user involvement to ensure alignment with institutional needs (Mahardika et al., 2025). This approach aligns with successful implementations in similar vocational contexts, such as the web-based training system proposed by (Ansyari et al., 2023) and the vocational monitoring information system developed by (Andhyni et al., 2024), which utilize iterative methodologies to enhance functional accuracy.

The novelty of this research lies in its strategic adaptation of the RAD methodology within a local government context, specifically tailored for vocational training institutions. Unlike previous generic registration systems, this study introduces a specialized integration of real-time reporting dashboards and automated assessment modules. This integration directly addresses the administrative bottlenecks at PPKD Central Jakarta, providing a more synchronized and responsive

data management framework that bridges the gap between public service demand and institutional processing capacity.

Through this approach, the resulting system is expected to optimize participant registration by improving efficiency, system structure, and digital integration. In a broader context, this research also contributes to the discourse on strengthening workforce competencies and enhancing local-level labor absorption through targeted digital transformation in vocational training services.

MATERIALS AND METHODS

Data Collection Methods

Data for this study were collected through multiple approaches to ensure both accuracy and alignment with the functional requirements of the proposed system:

1. Direct observation was conducted on the existing training registration process at PPKD Central Jakarta.

Direct observation was conducted on the existing training registration process at PPKD Central Jakarta. Participants in the training program were observed to obtain firsthand insights into both procedural and technical obstacles encountered during the implementation in the field. This approach allows researchers to directly examine the actual workflow and identify problems in the existing system (Januartika et al., 2023).

2. Interviews

Interviews were held with administrative personnel and registration staff to gather detailed information about workflow patterns, recurring technical issues, and the functional features desired in the new system. Interviews enable researchers to obtain in-depth information regarding user needs, operational procedures, and challenges experienced during system implementation. Through this method, researchers can collect qualitative insights that complement observational data and help define system requirements more accurately in information system development studies (Andhyni et al., 2024).

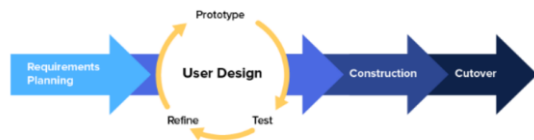
3. Literature Review

A comprehensive literature review was carried out by examining scholarly journals, textbooks, and reputable online sources that discuss information systems, e-government initiatives, Electronic-Based Government Systems (SPBE), and methodologies for web-based software development. This process aims to obtain a theoretical and conceptual foundation relevant to the research problem and system development approach. Literature studies enable researchers to

understand previous research findings, identify research gaps, and support the formulation of appropriate system design strategies (Rahmi et al., 2023).

System Development Model

This research was conducted in a structured and sequential manner, following a systematic process illustrated in Figure 1:



Source: (Habibi & Aprilian, 2020)

Figure 1. Rapid Application Development (RAD)

In developing the training participant registration information system, the researcher employed the Rapid Application Development (RAD) methodology. This approach was chosen due to its support for fast and iterative development processes, actively involving users at every stage. RAD is particularly well-suited for small to medium-scale projects that require flexibility and the ability to quickly adapt to changing requirements (Musvina et al., 2022). The following are the key phases of the system development process :

1. Requirement Planning

The initial phase involved identifying system requirements through collaborative discussions with stakeholders at PPKD Central Jakarta. Key focus areas included mapping the registration workflow, data validation mechanisms, participant selection management, and reporting procedures. Additionally, an analysis of both hardware and software requirements, as well as the technical constraints of the proposed system, was carried out.

2. User Design

During this stage, researchers and system users (administrators) collaborated to design a functional system prototype. The prototype was iteratively evaluated and refined based on user feedback to achieve a user centric design. The system architecture was modeled using the Unified Modeling Language (UML), complemented by Entity Relationship Diagrams (ERD) to define the database structure and ensure data integrity.

3. Construction

System development was executed using the PHP programming language, using the Laravel framework (version 12). The Model-View-Controller (MVC) architectural pattern was

applied, along with Object-Oriented Programming (OOP) principles, to enhance modularity and support future scalability. Throughout this phase, users remained actively involved by providing continuous feedback.

4. Cutover

System testing was conducted to validate its functionality and performance in accordance with user requirements. Katalon Studio was employed for functional testing to validate core features, including user authentication and NLP-driven query handling, achieving a 100% success rate across all test cases (Azhari & Suyatno, 2024). Simultaneously, Apache JMeter was utilized to evaluate system performance under simulated user loads, focusing on response time and error rates to ensure system stability during peak traffic conditions at PPKD Central Jakarta (Puspitasari, 2016). The application of automated testing and performance evaluation tools has been widely adopted to improve software reliability, efficiency, and scalability.

RESULTS AND DISCUSSION

Requirement Planning

Planning served as the initial phase in designing a digital solution tailored to user needs and aimed at optimizing the online registration process at PPKD Central Jakarta. The primary objective of this planning stage was to streamline previously manual workflows into a more efficient, transparent, and structured system. Based on a field-based needs analysis, the system was designed to support four distinct user categories :

1. Participant

Individuals intending to enroll in the training programs. These users are responsible for submitting registration forms via the system.

2. Officer

Officials responsible for conducting participant interviews and initial eligibility assessments.

3. Administrator

The administrator acts as the core operator of the system, managing data, workflows, and system configurations.

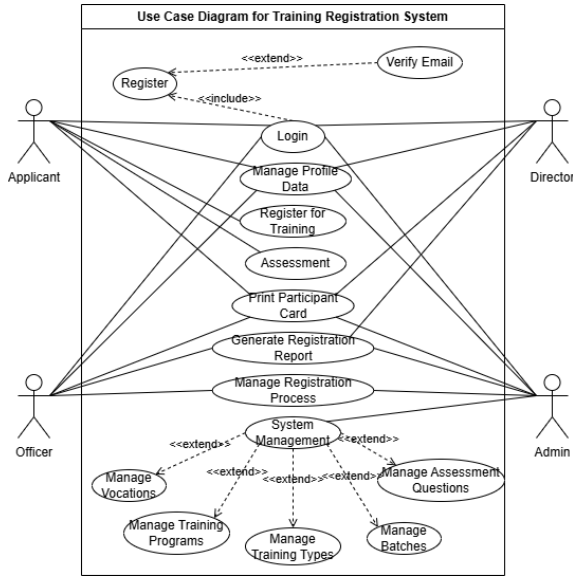
4. Supervisor

Supervisory personnel are granted monitoring access to oversee the overall registration process and ensure alignment with institutional objectives. Each role is assigned specific access privileges aligned with their respective responsibilities to ensure a cohesive and secure operational framework. Through this role-based access design,

the system is expected to enhance service efficiency and significantly accelerate administrative processes across the training center.

User Design

1. Use Case Diagram

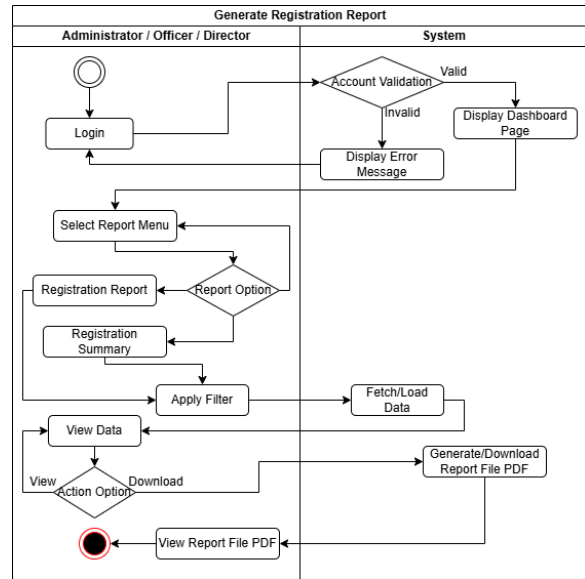


Source: (Research Result, 2025)
 Figure 2. Use Case Diagram of Training Registration System

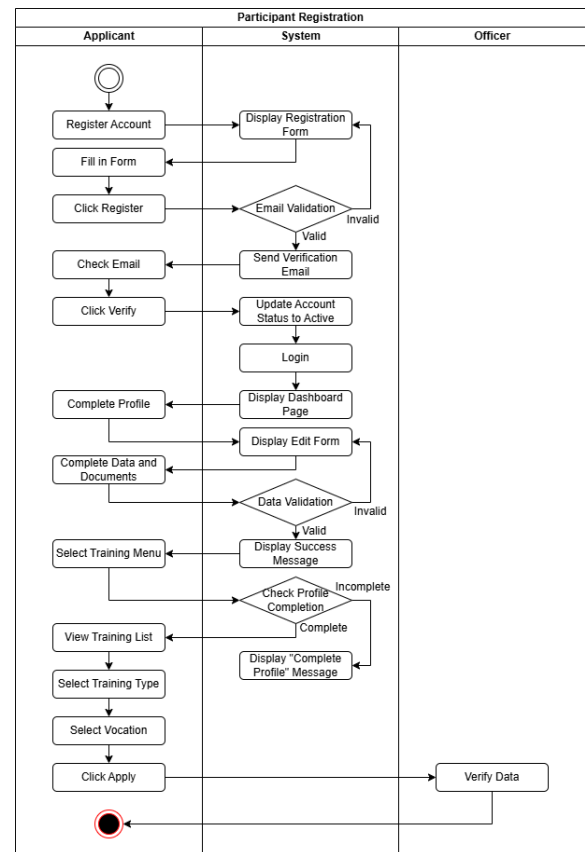
Figure 2 illustrates the system's access structure, which is explicitly restricted based on user roles. Each actor is granted access only to features relevant to their assigned responsibilities. For example, functions related to managing participant data and training schedules are exclusively available to administrators. This role-based access design is implemented to maintain control over system operations and ensure data protection.

2. Activity Diagram

Figure 3 illustrates the workflow for generating institutional documentation. After a successful Account Validation, the authorized actors (Administrator, Officer, or Director) can select between two main reporting types: a detailed Registration Report or a statistical Registration Summary. The system allows users to Apply Filters to customize the dataset before fetching the information from the database. Finally, the system provides a dual-action output where users can either View the Data directly within the dashboard or Download the Report in a portable format for offline decision-making.



Source: (Research Result, 2025)
 Figure 3. Generate Registration Report Activity Diagram



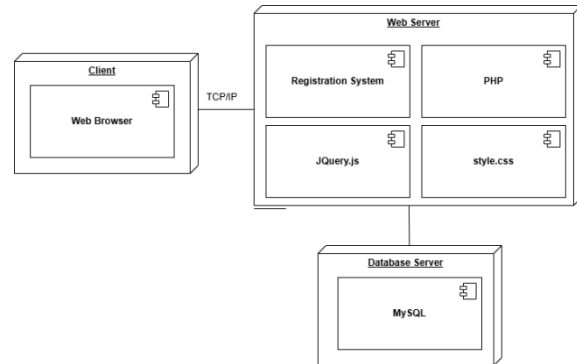
Source: (Research Result, 2025)
 Figure 4. Participant Registration Activity Diagram

Figure 4 illustrates the Participant Registration Activity Diagram, detailing the end-to-end workflow between the Applicant, the System, and the Officer. The process initiates with the Applicant creating an account, followed by a mandatory

Email Validation sequence to ensure security. Once authenticated, the Applicant must complete their profile and upload necessary documents. The System performs real-time Data Validation; if the requirements are not met, the Applicant is prompted to re-edit the form.

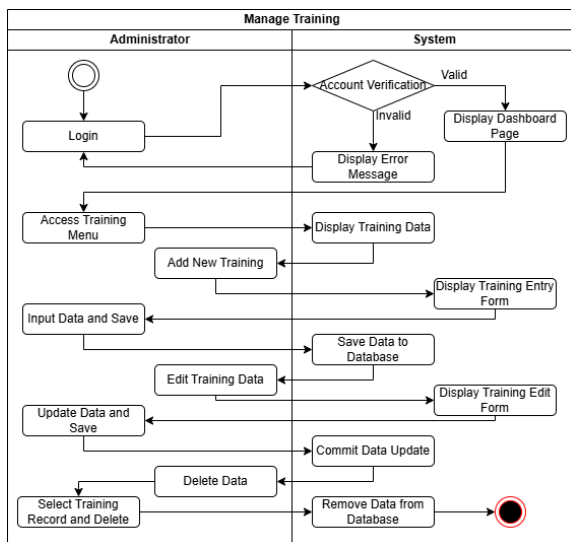
A key functional constraint is embedded in the workflow: the system executes a Profile Completion Check before allowing access to the training list. If the profile is incomplete, a notification is displayed, preventing premature application. The process concludes when the Applicant selects a specific training type and vocation, which then triggers a final Data Verification task for the Officer. This structured lifecycle ensures that only verified and complete data enters the institutional database, significantly improving administrative efficiency.

system through a web browser via TCP/IP. The web server handles the application using PHP, JQuery.js, and style.css, while the database server uses MySQL to store and manage data. This architecture enables efficient and integrated system operation.



Source: (Research Result, 2025)

Figure 6. Deployment Diagram of Registration System



Source: (Research Result, 2025)

Figure 5. Manage Training Activity Diagram

Figure 5 depicts the administrative workflow for managing vocational programs. The process initiates with a Login and Account Validation sequence. Once authenticated, the Staff can access the training dashboard to perform CRUD (Create, Read, Update, Delete) operations. The system ensures data integrity by providing specific forms for adding and editing training details, followed by automated data synchronization during the saving or deleting processes. This structured back-office management ensures that the information displayed to applicants remains accurate and up-to-date.

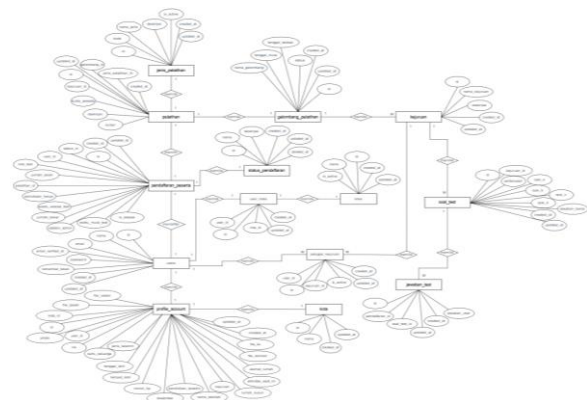
3. Deployment Diagram

As shown in Figure 6, the registration system consists of three main components: client, web server, and database server. The client accesses the

4. Entity Relationship Diagram (ERD)

The Entity Relationship Diagram (ERD) in Figure 7 illustrates the database structure designed to manage the training ecosystem at PPKD Central Jakarta. The system architecture centers on three primary domains: User Management, Training Registration, and Assessment.

Profile_account and users entities store comprehensive participant data, including demographic details and roles. The core business logic is handled through the pendaftaran_peserta entity, which bridges users with specific pelatihan (training) programs and gelombang_pelatihan (batches). Furthermore, the system incorporates an evaluation module where kejuruan (vocational areas) are linked to soal_test and jawaban_test to automate the selection or assessment process for applicants.



Source: (Research Result, 2025)

Figure 7. Entity Relationship Diagram of the Registration System

Code Generation

Development was carried out using Laravel version 12 as the primary framework, with MySQL serving as the database management system. Laravel itself is a PHP-based (Hypertext Preprocessor) web development framework that adheres to the Model-View-Controller (MVC) architectural paradigm, which promotes the separation of concerns in application design (Widodo Purbo, 2021). Additionally, the system is integrated with an SMTP-based email service, enabling automated notification delivery to enhance communication efficiency.



Source: (Research Result, 2025)
 Figure 8. Registration System Login Interface

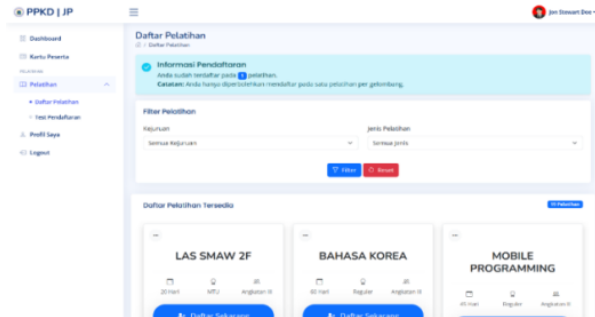
Figure 8 displays the login page. Users are required to enter their email address and password to access the system. An option is also available for new users to register for an account if they do not already have access credentials.



Source: (Research Result, 2025)
 Figure 9. Account Registration Interface of the Registration System

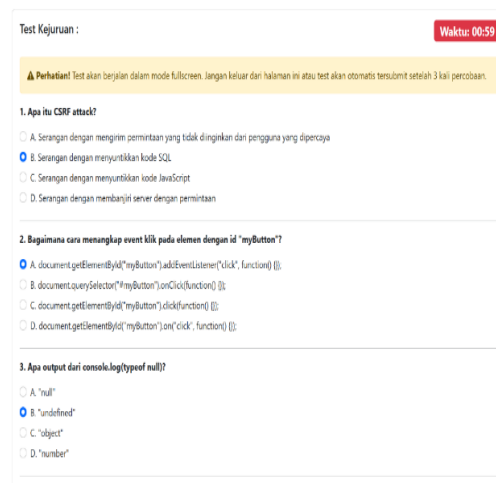
Figure 9 illustrates the participant account registration interface, which serves as the entry point for prospective trainees seeking to utilize the system. This process allows users to create their own accounts by submitting required personal information, such as full name, National Identity Number (NIK), active contact number, email address, place and date of birth, and current residence address. Additionally, users are

prompted to create and confirm a password to ensure account security. The implementation of this feature is intended to simplify user onboarding and enhance administrative efficiency by eliminating the need for physical interaction.



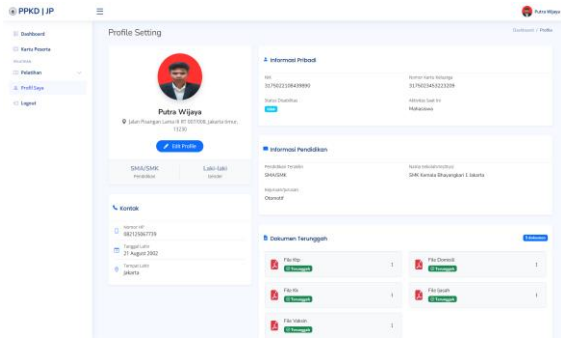
Source: (Research Result, 2025)
 Figure 10. Training List Interface

Figure 10 presents the Training List page interface, which allows participants to view currently available training programs and register for them online.



Source: (Research Result, 2025)
 Figure 11. Registration Test Interface

Figure 11 displays the registration test interface, which is used as part of the participant's skill evaluation after completing the training. This web-based vocational test consists of multiple choice questions designed to assess the participant's understanding of technical material relevant to their enrolled training field. The interface is configured to run in fullscreen mode to preserve exam integrity and minimize the risk of cheating. Participants are required to complete the questions within a set time limit, as indicated by the countdown timer located at the top-right corner of the interface.



Source: (Research Result, 2025)
 Figure 12 Profile Interface

The Participant Profile Page functions as a dedicated interface where users are required to update their personal details and submit supporting documents. This step is essential to ensure that all registration requirements are fulfilled prior to enrolling in any available training program.

Testing

System testing was conducted to ensure that all features functioned as intended and aligned with the system's design and user requirements. This study employed black-box testing as the primary validation method, focusing on system outputs in response to defined inputs, without examining the internal code structure. Each module such as user registration, login, data management, and email notifications was tested using realistic usage scenarios. Katalon Studio was utilized to perform automated functional testing, enabling thorough validation of workflows and user interactions. In addition, WAPT (Web Application Performance Testing) was implemented to evaluate the system's responsiveness and behavior under concurrent user load.

1. Functional Testing

Table 1. Functional Testing Results

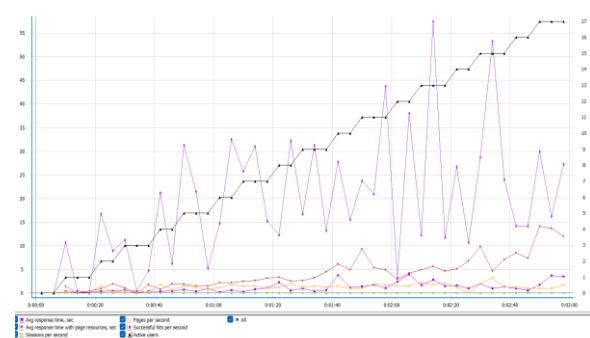
ID	Test Case Scenario	Status
1	Test Cases/Login	PASSED
2	Test Cases/Manajemen Profil	PASSED
3	Test Cases/Daftar Pelatihan	PASSED
4	Test Cases/Test Soal	PASSED
5	Test Cases/Kartu Peserta	PASSED
6	Test Cases/Manajemen Angkatan	PASSED
7	Test Cases/Manajemen Pendaftaran	PASSED
8	Test Cases/Laporan Pendaftaran	PASSED

Source: (Research Result, 2025)

The functional testing, executed on July 8, 2025, utilized Katalon Studio to evaluate the Registration System's Test Suite. As summarized in Table 1, the session encompassed eight critical test

cases—covering authentication, participant registration, assessment modules, and reporting. All scenarios achieved a 100% success rate with no detected errors, confirming that the system's core functionalities align with the predefined requirements.

2. Performance Testing



Source: (Research Result, 2025)
 Figure 33. Performance Testing

The performance testing results, as illustrated in Figure 13, indicate that the system maintained an average response time of 1.25 seconds and a page load time of 4.57 seconds under a load of 17 concurrent users. This performance aligns with the ISO/IEC 25010 quality standards, which categorize response times under 2 seconds as optimal for web-based applications to ensure a positive user experience (ISO 25000, n.d.). Considering the operational scale of PPKD Central Jakarta, where registration traffic typically occurs in batches, these results confirm that the system is more than sufficient to handle daily peak loads without latency issues.

The implementation of this system significantly improves administrative efficiency by automating manual data verification, thereby enhancing the quality of public services. Compared to the training registration system developed by (Dwi et al., 2022), this application offers better integration by linking the assessment module directly to the participant database, providing a more seamless workflow for both staff and applicants.

CONCLUSION

The development of a web-based training registration information system for PPKD Central Jakarta using the Rapid Application Development (RAD) methodology has successfully produced a system that meets user requirements. By involving administrative staff throughout the design and testing phases, the system effectively addresses

inefficiencies in the previously manual registration process. Functional testing confirmed that all core features operated in accordance with specifications. Furthermore, performance testing results demonstrated that the system is capable of handling 17 concurrent users with an average response time of 1.25 seconds and a page load time of 4.57 seconds, indicating strong system stability and reliable performance under simulated user loads.

Despite these results, this study is limited to the registration and assessment phases and has yet to integrate real-time attendance or post-training placement tracking. Addressing these limitations, the implementation of this system provides a strategic solution that significantly enhances administrative efficiency by automating the selection process. The digitalization of training services ensures broader accessibility for applicants while improving participant data management. Moving forward, future research should focus on integrating with other institutional services, incorporating training outcome monitoring features, and optimizing mobile accessibility to broaden the system's reach and ensure long-term sustainability.

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