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## Design and Implementation of Web-Based Online New Student Admission Information System (PPDB) at As-Syifa Kindergarten/PAUD

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**Abstract:** TK/PAUD As-Syifa in Pondok Aren, South Tangerang, previously managed its student admission process (PPDB) using a fully manual system. Prospective students' parents were required to visit the school directly, complete paper-based registration forms, submit supporting documents, and wait for confirmation from administrative staff. This conventional process often resulted in inefficiencies, including long processing times, difficulties in data management, the risk of document loss, and increased administrative workload. These challenges highlighted the need for a more efficient and reliable admission management system. To address these issues, this study developed a web-based PPDB information system designed to digitalize and streamline the student admission process. The system was developed using CodeIgniter as the framework, PHP as the programming language, MySQL as the database management system, and Bootstrap for the user interface. The development process followed the Waterfall software development model, consisting of requirements analysis, system design, implementation, testing, and deployment stages. Unified Modeling Language (UML) was utilized to model system requirements and workflows. System evaluation was conducted through Black Box Testing to ensure that all functions operated according to specifications. Testing covered 56 scenarios grouped into eight functional categories, including user authentication, multi-step registration forms, data verification, report generation, and session security. The results showed that all test scenarios were successfully completed without errors, achieving a 100% success rate. The implementation of the system has significantly improved the admission process. Parents can now register online at any time and from any location, while administrators can efficiently verify applicant data and generate Excel-based reports when needed. Furthermore, digital data storage reduces the risk of data loss and enhances overall administrative effectiveness.

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## Introduction

The adoption of information technology in the education sector is no longer merely an option but has become a necessity for institutions that seek to provide effective and efficient public services. Educational institutions, including Early Childhood Education (PAUD), create their first impression of quality and professionalism through the services they offer from the very beginning of the student admission process. However, many PAUD institutions continue to rely on conventional administrative methods that have changed little over the past two decades, such as paper-based registration forms, face-to-face queues, and the dissemination of information through printed brochures. These manual practices often result in inefficiencies, increase the workload of administrative staff, and limit the accessibility of information for prospective students' parents, especially in an era where digital technology has become an integral part of everyday life.

As-Syifa Kindergarten/PAUD, located on Jl. H. Sarmah Gg. H. Miun, RT.004/RW.007, Parigi Lama Village, Pondok Aren District, South Tangerang, experiences similar challenges during each New Student Admission (PPDB) period. Parents are required to visit the school directly to complete the registration process, while administrative staff manually record and recap applicant data. Such a system is vulnerable to human error, including inaccurate data entry, misplaced documents, and delays in administrative processing. In addition, information regarding registration schedules, requirements, and procedures is distributed only through printed brochures, which have limited reach and are often inaccessible to a wider community. These conditions indicate the need for a more integrated and technology-based solution that can improve the quality of educational services and facilitate communication between the school and parents.

Previous studies have demonstrated that the implementation of web-based PPDB systems can significantly improve administrative effectiveness and efficiency. Najamudin et al. (2019) developed a web-based admission application for SMK Negeri 2 Kuripan using CodeIgniter, successfully digitizing the registration, selection, and archive printing processes. Handayani et al. (2023) found that the implementation of a web-based PPDB system at SMAN 20 Tebo Regency accelerated administrative procedures and minimized the risk of data loss. Similarly, Fadli (2024) developed a Laravel-based system for Madrasah Aliyah Al-Fatah that included verification and proof-of-registration printing features, while Atmaja et al. (2024) designed a PHP and MySQL-based PPDB system that improved the management of prospective student data. Furthermore, Suryadin et al. (2025) enhanced the system at MTs Negeri 3 Purworejo by integrating an automatic selection feature, allowing admission results to be announced directly through the online portal. Despite these advancements, several research gaps remain. Existing studies focus primarily



on high schools and madrasas rather than early childhood education institutions, whose users—mainly parents of young children—require simpler access and clearer registration procedures. Moreover, important functionalities such as phased registration forms with step-by-step validation, administrator-controlled opening and closing of the admission period, Excel data export with status-based filters, layered URL security, and explicit role-based access control are rarely integrated into a single system.

Based on these considerations, this research aims to develop a web-based online PPDB information system specifically for As-Syifa Kindergarten/PAUD by incorporating several innovative features designed to address the identified gaps. The proposed system introduces four main novelties: (1) a multi-step registration form equipped

## Research Methods

This study employs a software engineering approach with an experimental descriptive method that encompasses the stages of data collection, requirements analysis, system design, implementation, and testing to develop a web-based PPDB information system. Data were collected through three complementary techniques, namely field observations conducted directly at As-Syifa Kindergarten/PAUD to understand the existing admission process and identify operational inefficiencies, interviews with the foundation head and administrative staff to explore system expectations and practical constraints, and literature studies based on previous research articles and technical documentation related to the technologies used. The system development process adopts the Waterfall model because the system requirements can be clearly defined from the outset (Pressman, 2002), with sequential stages consisting of requirements analysis, system design, coding, testing, and deployment. During the analysis phase, both functional and non-functional requirements were identified from the observation and interview results, while the design phase produced architectural documentation in the form of UML diagrams and database schemas. The system planning utilizes four UML models, including the Use Case Diagram to illustrate interactions between the two primary actors, namely prospective students (parents or guardians) and administrators, the Activity Diagram to describe the workflows of account registration, login, and form submission, the Sequence Diagram to show the sequence of interactions between system objects in both user and administrator scenarios, and the Class Diagram to define the relationships among entities such as User, Student, Verification, Announcement, and other supporting classes. The database is designed using MySQL and consists of eight interconnected tables, namely user, student, verification, announcements, *penghasilan\_ortu*, *pekerjaan\_ortu*, *pendidikan\_ortu*, and web, which stores system configurations including the PPDB open and close status, while database normalization is implemented to minimize data redundancy and maintain data integrity. Furthermore, the technology stack is selected based on ecosystem maturity and long-term maintainability, where CodeIgniter 3 serves as the backend framework with the Model-View-Controller (MVC) architecture to separate business logic, data access, and presentation layers, PHP 7 handles server-side processing within the XAMPP development environment, MySQL manages relational data storage, and Bootstrap 5 is utilized on the front-end to provide a responsive user interface across various screen sizes without requiring extensive custom CSS development.



## Result and Discussion

### 1. System Architecture and Implementation

The system is divided into two completely separate user panels: panel\_siswa for prospective students (parents/guardians) and panel\_admin for school staff. This separation is not just a matter of appearance; The authentication and authorization layers are configured so that each user can only access the functions to which they are entitled. The MVC architecture in CodeIgniter makes it easier to maintain code in case of changes in the future.

The public page contains information about As-Syifa Kindergarten/PAUD: school profile, registration flow, requirements, and contacts. Behind the page there is one important mechanism: when the admin closes the PPDB period, the automatic registration button stops working and the visitor is redirected to the notification page. This prevents entry registrations outside of the pre-set schedule.

### 2. Key Features of the System

The registration form is divided into six stages in a row: (1) approval of terms and conditions, (2) identity data of prospective students along with a 16-digit NIK, (3) complete address, (4) data of parents or guardians including work and education, (5) uploading documents such as photo passes and birth certificates with format and size validation, and (6) final confirmation before the data is saved. At each stage there is client-side validation that blocks the user if any data is blank or formatted incorrectly. This step-by-step approach proves to be more effective than a single long page because users know exactly which part they are in.

From the admin side, the dashboard displays a graph of the number of registrants per month so that the trend can be read at a glance. From the same panel, admins can open or close the PPDB period, verify registrants one by one, set a pass or non-pass status, and download Excel reports with three filter options: all data, verified data, or data that has been declared passed. There's also a table preview before the export is executed, so admins can make sure the data to be downloaded is appropriate.

Student panels are designed so that parents don't have to contact the school just to check their child's status. The dashboard displays the latest verification status and latest announcements from the school. Proof of registration can be printed directly from the portal with the school's letterhead. If the pass status has been set, an automatic notification will appear along with a button to print proof of graduation. One important detail: the URL of the proof of pass print page is protected, so students who have not yet passed cannot open it even if they know the address.

### 3. Black Box Testing Results

The test uses the Black Box Testing method, which is to test whether the system's output is as expected without looking at the code behind it (Myers et al., 2011). A total of 56 test scenarios were divided into eight functional categories, as shown in Table 1.



**Table 1.** Summary of Black Box Testing Results of PPDB Online System

Testing Categories	Number of Scenarios	Results Accordingly	Success Rate
Home & Public Navigation	4	4	100%
Multi-Step Registration Form	15	15	100%
Authentication of Prospective Students	4	4	100%
Prospective Student Panel & Dashboard	8	8	100%
Authentication & Admin Management	7	7	100%
Verification & Approval of Participants	9	9	100%
Data Export & Reporting	5	5	100%
Security & System Protection	4	4	100%
<b>Overall Total</b>	<b>56</b>	<b>56</b>	<b>100%</b>

All 56 scenarios pass without exception, so the functional success rate reaches 100%. The multi-step registration form category has 15 scenarios, covering a variety of conditions: mandatory fields being emptied, incorrect NIK formatting, upload files exceeding the size limit, and final confirmation flows. None of them fail, which means the validation logic on the client side works consistently.

The security and system protection category tests whether the access protection mechanism is working as it should. Direct access to protected URLs without active sessions is always directed to the login page. The same goes for the print URL of proof of passing: students who have not graduated are redirected to page 404 if they try to access it directly. This indicates that role-based access controls are running correctly in both panels.

#### 4. Comparative Analysis of Manual and Digital Systems

To understand the extent to which this system makes a real difference, a comparison of pre- and post-implementation conditions was conducted based on field observations and interviews with staff. The results are summarized in Table 2.

**Table 2.** Comparison of Manual System VS Digital PPDB System

Aspects	Before System (Manual)	After System (Digital)
Registration Process	Parents are required to come directly to the school; physical queues; Paper	Registration is done online 24 hours; no face-to-face required; Digital



Aspects	Before System (Manual)	After System (Digital)
	forms prone to loss	Stored Data
Processing Time	2-3 working days for manual verification and data recap of all registrants	Verification and announcement can be done in real-time in minutes
Risk of Data Loss	Height; paper forms are prone to damage, loss, or slipping; No automatic backups	Low; structured stored data in MySQL databases with multi-table management
Data Accuracy	Vulnerable to manual input errors; Validation is carried out by the committee visually	Automatic validation on each field; system prevents inappropriate data formats
Information Accessibility	Limited; Parents should come or contact the school for information	Open; Information on requirements, schedules, and selection results is available 24/7 through the web portal
Committee Workload	Height; All processes are done manually by school administration staff	Significantly reduced; most of the processes are automated; Committee Focuses on Final Verification
Reporting & Recapitulation	It takes time and effort to make reports and recaps of registrant data	Export data to Excel (.xlsx) can be done at any time with status and year filters

The most noticeable change is at the time of processing. What previously took 2-3 working days for manual verification and recap, can now be completed in minutes directly from the admin dashboard. It's not just about speed; Parents no longer need to wait for days just to find out if their child's file has been received or not. The elimination of paper forms also has an impact on operational costs: there is no longer a routine expense for printing forms and storing physical archives. Administrative staff can now focus on verifying and making graduation decisions, two things that do require human assessment, while other routine tasks are handled by the system.

## 5. Research Contributions

Practically, this system gives As-Syifa TK/PAUD the ability that was not previously possessed: managing PPDB from anywhere, anytime, without relying on the physical presence of parents or staff. The Excel export feature with filters makes it easier to prepare reports that have been done manually. In terms of institutional image, online registration portals give a professional impression that is relevant in today's era.

From a scientific perspective, this research fills a gap that has not been touched by many: the digital PPDB system for the PAUD level. Almost all similar studies focus on junior high school and above. In addition, testing with 56 documented Black Box Testing scenarios can serve as a methodological reference for similar research, especially those that want to ensure the scope of functional testing is broad enough.

Compared to previous studies as seen in Table 3, this study is the first to combine multi-step forms, PPDB status toggles, layered Excel exports, and session protection in one



system applied in PAUD institutions.

**Table 3.** Comparison with Previous Research

Researcher	Object of Study	Technology	Key Contributions	Limitations / Novelty
Najamudin et al. (2019)	SMK Negeri 2 Kuripan	CodeIgniter, UML	Online registration, selection, print archive	No data export and session protection features
Handayani et al. (2023)	SMAN 20 Kab. Tebo	PHP, MySQL, Waterfall	Accelerating PPDB, data accuracy increases	No direct URL access protection
Fadli (2024)	MA Al-Fatah	Laravel, MySQL, Waterfall	Online registration, verification, proof printing	No Excel export; no PPDB status toggle
Atmaja et al. (2024)	Public schools	PHP, MySQL, Waterfall	Online registration, selection announcement	There is no multi-step form; Limited session protection
Suryadin et al. (2025)	MTs Negeri 3 Purworejo	PHP, MySQL, Waterfall	Online registration, automatic selection	No PPDB open/close management feature
This research (2026)	Kindergarten/PAUD As-Syifa	CodeIgniter, Bootstrap, PHP, MySQL	Multi-step form, verification, Excel export, PPDB toggle, layered session protection	First, targeting the PAUD level; More features

None of the previous studies touched on all these features at once, especially at the PAUD level. This is what makes this research different, not only about the completeness of features, but also because it answers the needs of the segment of educational institutions that have received less attention in the information system literature.

## Conclusion

This research succeeded in building a web-based online PPDB information system for As-Syifa kindergarten/PAUD using CodeIgniter, PHP, MySQL, and Bootstrap. The system transforms the registration process that previously relied on paper and physical presence into a digital service that can be accessed at any time. Technically, the system includes a six-step registration form with automatic validation, an admin dashboard with statistical graphs, PPDB open/close controls, role-based verification and grading, export of Excel reports with filters, and layered session protection on both panels. Black Box Testing of 56 scenarios from eight categories resulted in a 100% success rate, meaning that all designed functions worked according to specifications. The impact is quite concrete: processing time drops from days to real-time, the risk of data loss is drastically reduced because everything is stored in a structured database, and parents no longer need to come to school just to register or check status. From the academic side, this study shows that a



complete digital PPDB system can be applied in early childhood education institutions with good results, something that has not been widely documented in the existing literature. For further development, this system can still be expanded. The integration of WhatsApp or email notifications for registration status updates will make the parental experience even better. Implementation of HTTPS needs to be done immediately before the system is used in a production environment. Formal User Acceptance Testing (UAT) involving real users is also feasible to validate the ease of use of the system more objectively.

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