

DIGITAL TRANSFORMATION OF STUDENT ENROLLMENT: BUILDING A ROBUST SPMB SYSTEM FOR SMPN 1 YOSOWILANGUN WITH LARAVEL AND WATERFALL APPROACH

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ABSTRACT

In today's digital era, educational institutions increasingly adopt web-based systems to improve the efficiency and transparency of student admissions. However, many small-scale schools in Indonesia still rely on manual admission methods, which are often inefficient and error-prone. This study aims to address these challenges by developing a New Student Admission Information System (SPMB) for SMPN 1 Yosowilangun using the Waterfall development model and Laravel framework. The system includes features such as online registration, digital document uploads, automated verification, and data management to ensure a transparent and efficient selection process. The development follows five stages: requirement analysis, system design, implementation, verification, and maintenance. Results show that the system significantly streamlines the admission process, reduces administrative workload, and improves selection accuracy. This study demonstrates the potential for small-scale schools to adopt digital solutions, contributing to more reliable and accessible student admissions in resource-limited settings.

Keywords: Admission system, Laravel, Waterfall Development, Website, Php

INTRODUCTION

In the current digital era, technology plays a pivotal role in transforming various sectors, including education (Haleem et al., 2022). One key area experiencing notable advancement is student enrollment, where web-based systems are increasingly utilized to streamline the process (Chansa Chanda et al., 2024; Idroes et al., 2024). Online registration platforms allow prospective students and their guardians to access essential information, complete digital forms, and upload required documents without visiting the school in person (Permatasari & Ibrahim, 2025). This shift from manual to digital platforms reduces processing time and administrative workload, offering a more efficient solution for both schools and applicants (Shelke et al., 2025). In addition, online student admission improves accessibility and convenience by reducing traditional barriers present in manual systems (Kanhaiya Lal Das, Peeraiah G, Kumar Akash, 2023).

Despite these advantages, many schools—especially smaller institutions—still rely on outdated manual admission processes (Kormos & Wisdom, 2021). This issue is particularly evident in Indonesia, where limited resources and technological barriers hinder the adoption of digital systems (Mhlanga, 2024). Manual processes are prone to errors, lack transparency, and can lead to misconduct in the selection process (Kean & Irmanto, n.d.; Tantri & Ismira, 2024).

Research by (Burhan, Nurwidyayanti, Andi Agusniati, Baharuddin, 2024), emphasizes the importance of transparency in admissions and how digital systems can address bias and corruption. At SMPN 1 Yosowilangun in Indonesia, several challenges highlight this need. The school does not yet use a computerized registration system,

which complicates the application process. Application documents are poorly organized, creating inefficiencies in data management. Furthermore, the existing process struggles to accommodate the various admission paths, making it difficult to evaluate applicants fairly. Manual systems are often ill-equipped to handle diverse admission channels, resulting in inconsistent outcomes (Mncube et al., 2023).

These limitations indicate the urgent need for a more effective and transparent student admission method. A transition to digital systems has been shown to enhance data accuracy and streamline processes (Kean & Irjanto, n.d.). However, existing studies rarely focus on smaller schools in Indonesia, where the challenges of digital transformation are often more complex.

Digital platforms contribute significantly to improving data accuracy and operational efficiency in small institutions (Enoch O. Alonge et al., 2024). Research on web-based admission systems shows their positive impact. For example, (Melia Rika Umbu, Stefanus D.I.Mau, 2023), implemented the Web Development Life Cycle (WDLC) to build student registration systems that help schools save costs and reduce risks of corruption, collusion, and nepotism. In another study, (Istiqomah et al., 2021) examined the implementation of online student admission using a zoning system and data collection methods such as observation, interviews, and documentation, with triangulation techniques to validate findings. Study by (Sahombu, 2024) employed Laravel and Scrum frameworks to enhance flexibility and efficiency during system development, ensuring the resulting system is secure, reliable, and well-structured.

Further research by (He, 2015; Mahadi et al., 2025), highlights Laravel's scalability and suitability for building robust systems in resource-limited settings. The Waterfall model has also been applied in development projects, particularly in the early stages involving needs analysis and system design, to ensure structure and thorough documentation (Pendaftaran & Komunikasi, 2025).

This research aims to address the existing gap by developing a New Student Admission Information System (SPMB) for SMPN 1 Yosowilangun, a school located in an area with limited access to technology and resources. The school faces challenges such as manual registration processes, poorly organized document management, and a lack of transparency in the selection process. As a result, SMPN 1 Yosowilangun will serve as a case study, with the system built using the Laravel framework and the Waterfall development model. The primary goal is to improve the efficiency, accuracy, and transparency of the school's enrollment process, making admissions more manageable for both applicants and administrators.

Additionally, this research explores the specific challenges faced by schools like SMPN 1 Yosowilangun, which are crucial to consider for successful digital implementation in Indonesia's educational context. The structured, sequential nature of the Waterfall model supports careful planning and evaluation at each development stage, ensuring that all system requirements are thoroughly addressed. Laravel was chosen for its user-friendly features, scalability, and built-in tools for authentication, routing, and database management—ideal for building a secure and robust platform (Senarath, 2021)(Musyary et al., 2023).

Although prior research has discussed the benefits of digital enrolment systems, few have examined the combined use of Laravel and Waterfall in the context of small schools. A study by (Monika Singh et al., 2024), supports the practicality of integrating these tools to develop efficient and scalable systems for smaller educational institutions.

This study contributes to the literature by demonstrating how these technologies can be applied to improve administrative processes at SMPN 1 Yosowilangun.

Ultimately, this research aims not only to enhance the operational efficiency of the school but also to promote fairness and transparency in student admissions. By showcasing the applicability of digital systems in small, resource-constrained schools, this study offers valuable insights into the broader potential of digital transformation in Indonesia's education sector.

RESEARCH METHODS

The development of this system follows the Waterfall Development Methodology, with the following detailed steps :

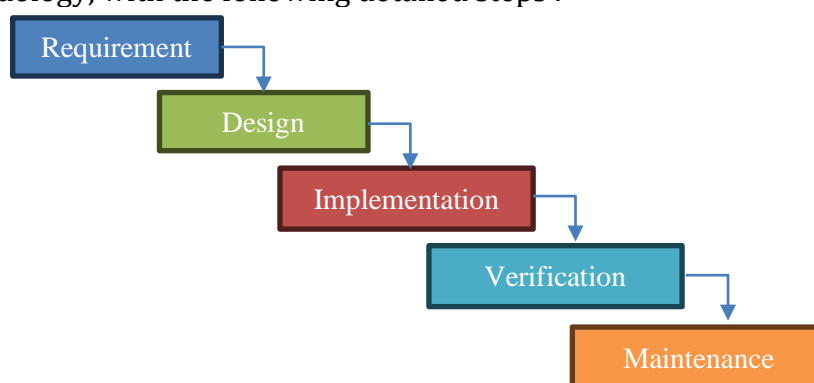


Figure 1. Waterfall Methods

1. Requirement : In the requirement phase, the systems needs and functionalities are defined. This phase focuses on understanding the problems, goals and requirements that systems must address. Key requirements identified includes:
 - a. Online Registration
 - b. Document Upload
 - c. Data Verifications
 - d. Automation Selection Process
 - e. Online Announcement.
2. Design : the design focuses on how the system will interact with users, what components are needed and how data will be managed. System architecture design consists of frontend (user interface) and backend (server and database). Also for database design using ERD and use case.
3. Implementation : in the implementation phase, the steps involves writing the code, integrating databases and ensuring that the frontend and backend component work together seamlessly. The system is built using PHP and Laravel framework, the functionality include :
 - a. User registration and login
 - b. Registration form submission and document upload
 - c. Admin authentication and document verification
4. Verification : during this system phase, the system is tested to ensure that it work as expected and that all features are functioning properly. There are

two main types of testing conducted (Blackbox and UAT).

5. Maintenance : After the system has been deployed and live, maintenance phase dedicated to ensuring the system continues to function properly overtime, handling any issues that arise and implementing improvements.

By following the waterfall methodology, the development system of SPMB at SMP Negeri 1 Yosowilangun is systematically carried out, ensuring each phase is fully addressed before moving to the next, resulting in a robust and user friendly system.

RESULTS AND DISCUSSION

The website-based SPMB system at SMPN 1 Yosowilangun aims to simplify and automate the student admission process. Here are the main procedural steps of the system :

1. Online Registration

Prospective students complete the registration form online, making it convenient for applicant without the need for a physical visit.

2. Document Upload

Document such as birth certificates and reports cards are uploaded in digital format, facilitating verification and reducing paper usage.

3. Online Document Verification

Admin verifies documents online, such as identity documents, report cards, and other supporting documents, speeding up the process and reducing manual errors.

4. Applicant Data Management

The committee manages applicant data through the system, ensuring that data is more organized and easily accessible.

5. Automated of Selection Process

Selection is automatically conducted based on the admission path, ensuring quick and objective results.

6. Print Reprint Feature

Applicants can reprint their registration proof and selection card online if needed.

1. ERD

The ERD illustrate a student management system with entities like New Student, Parent, Admin, Registration, Document, Track Admission (Tahfidz track, Academic Track, or Non Academic Track), Report, Subject and Information.

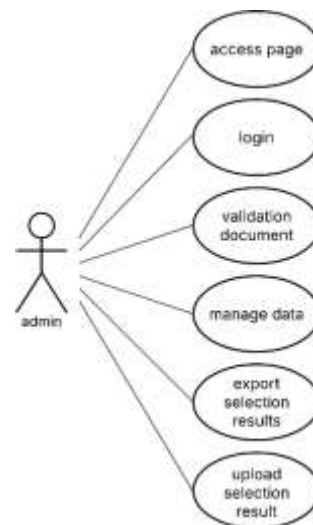
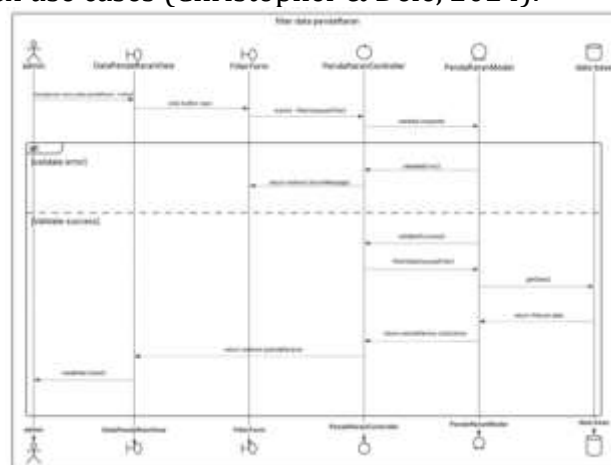


Figure 4. Use Case Administrator

Initially, the admin accesses the main page and logs into the system using valid credentials. Upon successful login, the admin is granted the ability to perform document validation, ensuring that the uploaded files conform to the established standards. Furthermore, the admin has control over the data management process, which includes tasks such as adding, editing, or removing data entries as necessary. Additionally, the admin can export the results of selections made within the system and upload the corresponding selection outcomes, typically in the form of documents or files. This diagram highlights the admin's central role in managing and overseeing critical operational tasks within the system, emphasizing their responsibility in ensuring system integrity and functionality.

3. Activity Diagram

Activity diagrams are employed to depict the sequence of events in a use case diagram, showcasing the dynamic behavior of a system through control and object flows from one action to another. Activity diagrams are essential for visualizing system processes. Particularly effective for modeling security needs in business operations, managing parallel and concurrent flows in real-world systems, and providing detailed illustration of complex use cases (Christopher & Dele, 2024).




```
public function middleware(): array
{
    return [
        'auth' => $this->auth,
    ];
}

public function handle($request, Closure $next): mixed
{
    if ($request->user()) {
        return $next($request);
    }

    return $this->redirectTo($this->getRedirectUrl());
}

protected function redirectTo($url): void
{
    return redirect($url);
}

protected function getRedirectUrl(): string
{
    return $this->redirectTo($url);
}
```

Figure 7. Laravel Codes for Zonasi

```
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{
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}
```

Figure 8. Laravel's Code for Afirmation Student

6. Application System

- a. The display when the admin logs into the application.



Figure 9. Administrator's Login

- a. The display of registrant/student candidates' data.

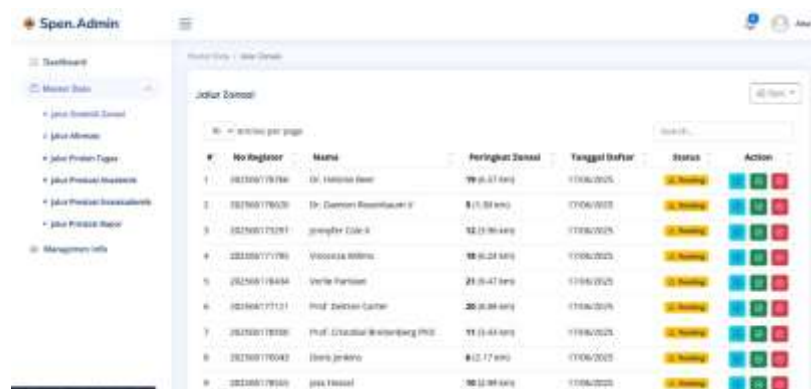


Figure 10. Candidate's Page

a. Student's login page



Figure 11. Student's Login Page

b. Upload document's page



Figure 12. Document's Upload Page

CONCLUSION

Shift from traditional manual student enrollment system to web-based solutions offers significant benefits, particularly in improving the efficiency, accuracy and transparency of the process. While many larger institutions have embraced digital systems, smaller schools, particularly in Indonesia still face challenges in adopting new technologies due to resource constraints. By integrating New Student Admission Information System (SPMB) for SMPN 1 Yosowilangun, using the Laravel Framework and the Waterfall developments approach, aims address the inefficiencies and error commonly associated with manual systems, promoting fairness and transparency in the admission process.

Laravel's security features and user-friendly tools for authentication, database management, and routing make it an ideal choice for developing a robust, secure, and scalable system. The Waterfall development approach ensures a structured, step-by-step process, allowing for thorough planning, testing, and documentation at each phase. This approach, combined with Laravel's capabilities, addresses the unique needs of smaller schools, making the transition to a digital enrollment system both feasible and efficient.

By implementing the SPMB system at SMPN 1 Yosowilangun, the school can significantly reduce administrative errors, streamline the admission process, and provide a more accessible platform for prospective students and their families. Ultimately, this system enhances operational efficiency, promotes transparency, and builds trust among stakeholders, demonstrating how even resource-constrained institutions can benefit from the digital transformation of their administrative processes.

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