International Journal of Informatics, Economics, Management and Science
http://journal.stmikjayakarta.ac.id/index.php/ijiems
E-ISSN: 2809-8471 (online), **P-ISSN:** 2809-9281 (Print)
DOI: 10.52362/ijiems.v4i2.2040
Volume 4 , Issue 2 , August 2025, pp. 123-132

Implementation of a Web-Based New Student Admissions Application (PPDB) at the Al-Kautsar Mauk Islamic Boarding School

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Received: May 20, 2025; **Accepted**: August 15, 2025 ; **Published**: August 30, 2025

Abstract: The manual new student admissions (PPDB) process in Islamic boarding schools creates various obstacles such as time inefficiency, data input errors, and the risk of archive loss. This study aims to design and implement a web-based digital new student registration system at the Al-Kautsar Mauk Tahfidzul Qur'an Islamic Boarding School. The method used is software engineering with a Waterfall model approach, starting from needs analysis, design, development, and evaluation. The results show that the system can speed up the form filling process from 10–15 minutes to 2–3 minutes per participant, as well as improve the accuracy and security of data storage through the integration of Google Apps Script and Google Spreadsheets. The system allows admins to access and filter data in real-time without manual re-input. Trials were conducted through simulations with 10 participants and training was provided to admins to ensure smooth implementation. In conclusion, this web-based student admissions (PPDB) system has a positive impact on the efficiency, transparency, and readiness of Islamic boarding schools in facing the digitalization of educational administration.
Keywords: software engineering, waterfall, google apps script, google spreadsheet, student admissions application

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1. Introduction

The implementation of a web-based New Student Admissions (PPDB) application at the Al-Kautsar Mauk Islamic Boarding School aims to improve efficiency and accuracy in the new student admission process, which was previously carried out manually[1]. By utilizing information technology, administrative activities at the Islamic boarding school, particularly PPDB, can be carried out more quickly, transparently, and well-documented.

Several previous studies have also discussed the importance of digitizing the education system in Islamic boarding schools. For example, implementing a digital system can reduce the risk of administrative errors and increase community participation[4]. Emphasized that digitizing educational information supports the modernization of learning and management systems [2].

This research aims to design and implement a digital PPDB system at the Al-Kautsar Mauk Islamic Boarding School using WordPress integrated with Google Apps Script. The method used is a waterfall-based[8][9] software engineering approach, starting with needs analysis, design, implementation, and evaluation[1]. The results achieved are a PPDB system that functions well and is understandable by Islamic boarding school users. The conclusion of this study is that a web-based information system approach can be a practical and effective solution in Islamic boarding schools.

The main content discussed in this article includes the design process, system trial results, and the impact of its implementation on the management of new student admissions (PPDB) at Islamic boarding schools[5]. This research makes a significant contribution to the digital transformation of Islamic boarding school-based education, particularly in the administrative aspects of new student admissions.

2. Research Method

This research employed a software engineering methodology with a waterfall development model, consisting of requirements analysis, system design, implementation, testing, and maintenance[8][9]. The object of this research was the Al-Kautsar Mauk Tahfidzul Qur'an Islamic Boarding School, a pesantren-based Islamic educational institution that lacks a digitalized system for its PPDB administration[1].

Data collection was conducted through direct observation, interviews with the boarding school administrators, and analysis of documents used in the previous registration process. Next, a system design was conducted, including flowcharts, class diagrams, ERDs, and UI design using diagramming tools[6][10].

Data analysis was conducted descriptively, comparing the previous manual process with the implemented digital system. Evaluation was conducted through system testing and user feedback, without the use of statistical software, but with logical and narrative interpretation of system performance[7].

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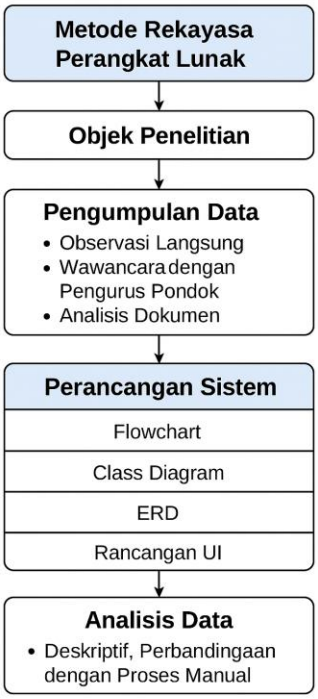

Figure 1. Research flowchart

This research flowchart illustrates the software engineering methodology process using the Waterfall model used in developing a web-based PPDB system at the Al-Kautsar Mauk Islamic Boarding School.

Software Engineering Method: The first step is selecting a systematic and sequential software engineering method, starting from analysis to system maintenance.

Research Object: The primary focus of this research is the Al-Kautsar Mauk Tahfidzul Qur'an Islamic Boarding School, which faces challenges in manually managing PPDB administration[1].

Data Collection: Data was collected through direct observation to understand the current process, interviews with boarding school administrators to identify needs, and analysis of previously used registration documents.

System Design: Involves the creation of flowcharts, class diagrams, entity-relationship diagrams (ERDs), and user interface (UI) design. This step aims to visualize how the system will function and how data will be managed[2].

Data Analysis: Conducted descriptively by comparing the previous manual process with the implemented digital system. User feedback was also used to evaluate system performance and make necessary improvements.

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3. Research Result and Discussion

The research results showed that the web-based PPDB system was successfully implemented in the Islamic boarding school environment. The official website successfully displayed a registration form that automatically connected directly to Google Spreadsheets using Google Apps Script. Applicant data was entered in real time and could be filtered as needed.

The Waterfall methodology is used because it's well-suited for projects with clearly defined requirements at the outset and is carried out sequentially. Each stage must be completed before moving on to the next.

3.1. Needs Analysis

At this stage, the development team conducted direct observations at the Al-Kautsar Mauk Islamic Boarding School and conducted interviews with administrators. The goal was to identify system requirements, including:

a) The registration process must be online.
b) Participant data must be automatically saved without manual input.
c) Data must be easily viewed and filtered by the admin

This needs documentation formed the basis for the system design.

Table 1. *observation and interview table*

No.	System Requirement	Observation Result	Interview Result
1	The registration process must be done online.	Administrators still use paper forms for registration, which complicates recapitulation and requires significant time for data entry.	"We want the registration process to be done via mobile phone only, without the need to come in person and fill out paperwork, so it's easier for students from outside the region."
2	Participant data must be automatically saved without manual input.	Participant data must be re-entered into the computer after paper collection, risking typos and data loss.	“We often have to work overtime to copy data from paper to computer, and sometimes data gets mixed up or lost.”
3	Data should be easy for admins to view and filter.	There's no quick search system. The large amount of participant data makes it difficult to sort according to specific needs.	"We need a quick way to view the data of applicants who have already been accepted, for example by school of origin, program of choice, or document verification status."

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3.2. System Design

Based on the needs analysis, a system design was conducted with several important components:

a) Interface Design: The user interface is designed with a simple yet informative display for ease of use by parents/guardians of prospective students.

Figure 2. User Interface Design

b) Flowchart: To illustrate the system process, from filling out the form to entering the data into the spreadsheet.

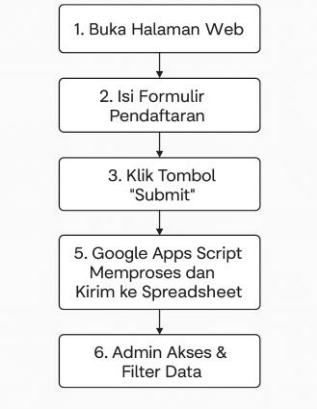

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Figure 3. Flowchart Entering Data

c) ERD (Entity Relationship Diagram): To illustrate the data relationships between entities such as participants, schedules, and selection results.

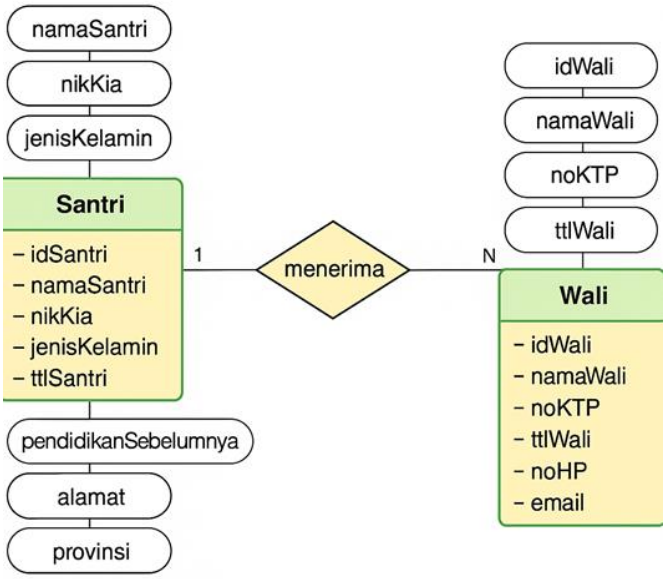

Figure 4. ERD (Entity Relationship Diagram)

3.3. Development and Implementation

This stage is the core of the registration system's transformation from a manual, paper-based method to a digital, web-based one. The development is carried out using accessible, cost-effective, and automated technologies, namely the Google ecosystem and basic web technologies.

3.3.1. Website Interface Creation (Front-End)

The development team built the registration system interface using the following web technologies[4][5] with the results are as in figure 2:

a) HTML (HyperText Markup Language)
Used to create the basic structure of the web page, such as the title, input form, submit button, and explanation of the registration procedure.

b) CSS (Cascading Style Sheets)
Used to enhance the appearance of the registration form, adjust colors, fonts, margins, and responsiveness so that it can be accessed on various devices (mobile phones, tablets, laptops).

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c) JavaScript (JS)
Used to add interactivity to the page, such as validating input before the form is submitted, displaying a successful submission notification, and redirecting users to a confirmation page.

3.3.2. Automation with Google Apps Script

Google Apps Script is used to automate the following data flows:

a) Data from forms is automatically entered into a Google Spreadsheet.
b) Apps Script is used to:
c) Adjust the format of incoming data.
d) Add email notifications to admins when new registrations are received.
e) Filter or move data based on program selection or verification status.
f) Avoid duplicate entries.
g) Perform automatic calculations when necessary, such as the number of applicants per program.
h) Google Apps Script is written in JavaScript and runs through Google's built-in editor (script.google.com), without requiring additional installation.

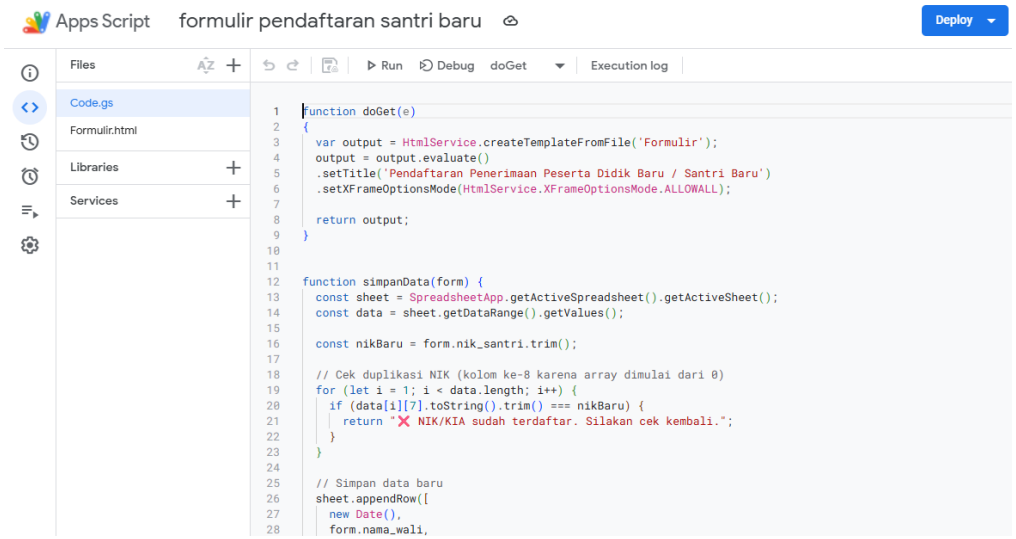

Figure 5. Google Apps Script Editor for PPDB Application

3.3.3. Data Storage and Access with Google Sheets

Google Spreadsheets was chosen as the primary database because:

a) It integrates directly with Google Services.
b) It enables real-time collaboration between admin teams.

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c) Data is easy to filter, sort, and print.
d) It does not require the installation of a conventional database system (e.g., MySQL or PostgreSQL), making it more practical and efficient for the Islamic boarding school scale.

Each registration entry is recorded as a single row of data in the spreadsheet. Admins can:
a) Mark document verification status.
b) Search by name, school of origin, or program.
c) Create summary reports.

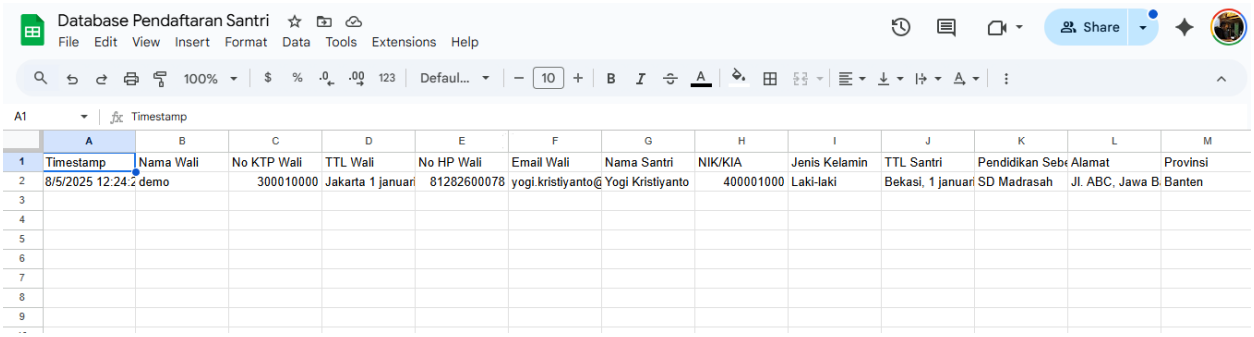

Figure 6. Data Storage and Access with Google Sheets

3.4. Testing and Evaluation

The online registration system was tested through a form-filling simulation by several participants[3]. This process aimed to evaluate time efficiency, data accuracy, and cloud storage reliability.

Testing Methodology
a) Method: Form-filling simulation by 10 participants.
b) Tools: Google Apps Script, Google Sheets.
c) Assessment Criteria: Filling time, data accuracy, and speed of data access by the admin.

Table 2. *Test Result*

Parameter	Manual Method	Online System
Time to fill out per form	10-15 minutes	2-3 minutes
Data accuracy	Prone to input errors	Minimal input errors
Data storage	Physical archives (prone to loss)	Google Drive Cloud (secure)
Data access by admin	Slow and manual	Real-time and filtered

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3.5. Implementation and Maintenance

Following the successful testing phase, the online registration system was officially implemented within the Islamic Boarding School. The initial implementation step involved outreach to prospective guardians, providing them with detailed guidance on how to access and complete the form, which serves as the primary input medium. This process aimed to ensure that prospective students and guardians understood the digital data entry process and minimize input errors[10].

Furthermore, training was conducted for administrative staff and ustadz (teacher) responsible for managing student data[3]. This training covered the use of Google Spreadsheets as the primary database and the use of Google Apps Script to automate data processing, such as sending notifications or validating data. Admins were also provided with an understanding of how to back up data to Google Drive to maintain information security and integrity.

In addition, system monitoring is conducted regularly to ensure stable performance and avoid potential technical errors that could hinder the registration process. With this structured approach, the online registration system is expected to improve efficiency, accuracy, and transparency in the new student admission process at Islamic boarding schools.

4. Conclusion

The implementation of a web-based New Student Admissions Application (PPDB) at the Al-Kautsar Mauk Islamic Boarding School has had a positive impact on the efficiency of Islamic boarding school administration. It not only shortens data input time but also improves the accuracy and security of new student data storage. This research demonstrates that simple technologies like Google Apps Script and Google Spreadsheet can provide real solutions for Islamic boarding school-based educational institutions facing the challenges of digitalization.

The primary contribution of this research lies not only in the technical aspects of the system, but also in the process of knowledge transfer, training, and shifting the work culture towards a more modern and structured direction. With this system, the Al-Kautsar Islamic Mauk Boarding School is better prepared to manage registration data digitally in the future and opens up opportunities for the development of other information systems.

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