Analysis and Development of a School Platform with a User Experience Approach at Samirejo 3 Elementary School

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Abstract: The digitization of educational services has become an important need for schools to improve the effectiveness of data management and information delivery. Samirejo 3 Elementary School still applies manual processes in attendance recording, information management, and communication with parents, resulting in frequent delays and inaccuracies in data. This study aims to analyze and develop a web-based school platform using a User Experience (UX) approach to make the system easier to use and better suited to user needs. The research methods include observation, interviews, and literature study, while system development uses the Waterfall model. System evaluation is conducted using User Acceptance Testing (UAT) and the System Usability Scale (SUS). UAT involved 10 respondents consisting of admins, teachers/class guardians, and parents, with an average result of 95.6%, indicating that the system was very well accepted. UX testing using the SUS method involved the same respondents and obtained an average score of 79, which falls into the Good category, indicating that the system is easy to understand, efficient, and comfortable to use. The research results show that this platform can enhance data management efficiency, accelerate information dissemination, and provide a more optimal user experience. Thus, the developed platform supports the school's digital transformation and improves the quality of information services at Samirejo 3 Elementary School.

Keywords: School Platform, User Experience, Web, Development, Information.

1. Introduction

The rapid development of information technology has had a significant impact on various aspects of life, including the field of education. The use of technology is not only intended to accelerate human work processes, but also to improve efficiency, accuracy, and the quality of the information produced [1]. Before the advent of digital systems, the process of managing information in schools was carried out manually, so it took a long time, was prone to errors, and was less effective in supporting the needs of educational services. In today's digital era, school websites are one of the important media to convey information widely and in real-time through the internet network [2]. However, previous studies have shown that the majority of school information systems still focus on the appearance of static information such as profiles, vision and mission, and school news. The lack of operational features and the absence of user experience (UX) evaluation are significant gaps in previous studies.

Samirejo 3 Elementary School experienced a similar problem. Announcements, documentation of activities, and academic information are still delivered through print media. The recap of the attendance of students in grades 1-6 is done manually so that the reporting process to the student's guardian is often late. This shows the need for a web-based platform that is able to integrate school data, accelerate information distribution, and provide real-time transparency. The integration of the attendance recap feature with automatic WhatsApp notifications for students who are absent

without information is also needed to increase the effectiveness of communication. In the system development process, a UX approach is used to ensure the quality of user interaction [3]. UX concentrates on the overall user experience, including ease of use, accessibility, and efficiency in interacting with digital products [4]. The usability evaluation was carried out using the System Usability Scale (SUS) method as a standard instrument to measure the level of convenience and feasibility of the system quantitatively. The development of the system follows the Waterfall model through the stages of needs analysis, design, implementation, and testing carried out using Black Box Testing to check functionality as well as User Acceptance Testing (UAT) and SUS to evaluate the level of user comfort and convenience.

Several previous studies by [5] at SMK Minhadlul Ulum, [6] at MI Manbail Futuh Jenu Tuban, and [7] at SDN 4 Kota Bengkulu tended to focus on presenting general information without providing operational features that support teachers' workflows, such as digital attendance summaries or automatic notification integration. Additionally, the system is not yet equipped with standardized UX evaluation, even tho usability is crucial for ensuring ease of use and user acceptance. Based on the description, the problem formulation in this study includes how to design and build a web-based school platform that can improve the effectiveness of information delivery at Samirejo 3 Elementary School, and how the UX approach thru the SUS can be used to evaluate the ease of use and level of system acceptance by users. This study aims to develop and evaluate a web-based school platform with a UX approach to improve communication effectiveness, data management, and user comfort at Samirejo 3 Elementary School.

2. Literature Review

The development of web-based school platforms has been widely implemented in various educational contexts, proving to increase information accessibility, data management efficiency, and transparency for teachers, students, and parents. Research conducted by [5] at SMK Minhadlul Ulum, [6] at MI Manbail Futuh Jenu Tuban, and [7] at SDN 4 Kota Bengkulu shows that a school information system can facilitate the rapid and centralized delivery of information. On the other hand, research [8] at SMPN 1 Sambit Ponorogo and [9] at SMK Al-Muajirin emphasizes the importance of the UX approach in building school websites that are easy to use, comfortable, and meet user needs. However, to critically synthesize the research, it is necessary to identify its functional limitations in order to find research gaps [10]. A comparison of the features, methods, and weaknesses of these key studies is summarized in Table 1.

Table 1. Comparison of Previous Studies and Research Innovation

Researcher (Year)	Main Features	Method	Weakness (Research Gap)	Innovation in This Research
Nurkholis dkk. (SMK Minhadlul Ulum, 2022)	School profile, vision and mission, facilities, activities	*Prototype*	There are no operational features such as attendance summaries; no automatic notifications; has not implemented in-depth UX evaluations	Complete school data integration + teacher login for attendance recap + automatic WhatsApp notifications
Ulfatus dkk. (MI Manbail Futuh Jenu, 2024)	Basic academic & administrative information	*Prorotype*	Does not include a digital attendance module; no WhatsApp Gateway; no UX testing	Digital attendance recap + WhatsApp notifications + UX with UAT
Utami dkk. (SDN 4 Bengkulu)	School profile, organizational structure, vision and mission,	*Waterfall*	Focus on general profiles; no operational features for	Complete operational system for

	facilities and infrastructure		teachers/admin; no UX testing	teachers/admins + UX user experience
Agastya & Farida (SMPN 1 Sambit, 2023)	UI/UX Design	*User Centered Design (UCD)*	Only UI/UX design, no WhatsApp integration for attendance	UX with SUS evaluation method + functional system + UAT testing
Fitria dkk. (SMK Al-Muhajirin, 2025)	Informative UI/UX design	*User Centered Design (UCD)*	No digital presence & notifications via WhatsApp	Functional school system with operational features + UX for users

Based on a comparison of previous studies, it can be concluded that previous research still focuses on providing basic school information without integrating operational features such as digital attendance summaries, integrated data management, or automated communication mechanisms with parents. Additionally, none of the studies have implemented notifications to support real-time information delivery, especially in the context of student attendance.

The UX approach used in previous research was also limited to the interface design stage and did not include usability evaluation using standard methods such as the SUS. In fact, a SUS evaluation is needed to objectively assess usability, especially in rural elementary schools with varying levels of digital literacy. This research fills that gap by integrating three key innovations: (1) a school operational platform that includes data management and digital attendance recap; (2) an automated notification system via WhatsApp Gateway; and (3) UX evaluation using the SUS method to quantitatively measure usability levels. The integration of these three aspects is a significant differentiator compared to previous research and is relevant to the needs of Samirejo 3 Elementary School.

3. Methods

A. Research Data and Location

This research was conducted at Samirejo 3 Elementary School, Jl. Kaliyetno Kulon No. 370, Samirejo Village, Dawe, Kudus 59353. The data needed for this research were collected from the primary source, namely Samirejo 3 Elementary School, using methods or ways to meet the data or information needs of this study [11]. The data collection methods used in this study are as follows: 1) Observation. Observation was conducted directly at Samirejo 3 Elementary School to identify problems in information delivery and school data management. Quantitative data obtained from the observation included student enrollment patterns, attendance records, and school announcement documents that were still created manually. Additionally, qualitative data indicates that the recap process is time-consuming and prone to discrepancies due to double-entry by teachers. 2) Interviews. Interviews were conducted with the school principal, teachers, and staff to gather system requirements related to digital attendance, school data management, and information dissemination to parents. Qualitative data in the form of user complaints and expectations, as well as quantitative data on active system users, were obtained from the interviews. The class teacher emphasized the need for a centralized attendance system and automatic notifications to parents to expedite the reporting process. 3) Literature Study. The literature study was conducted by reviewing various journals, scientific articles, and previous research related to the development of school information systems and the UX approach for using the SUS. This study aims to strengthen the theoretical foundation and serve as a reference in determining the system methods and design that will be developed.

B. System Development Method

The system development in this research uses the waterfall model. This model applies a systematic and sequential approach. Its development is linear, starting from the initial stage of planning to the final stage, which includes system maintenance. The following are the stages of the waterfall model, as shown in Figure 1.
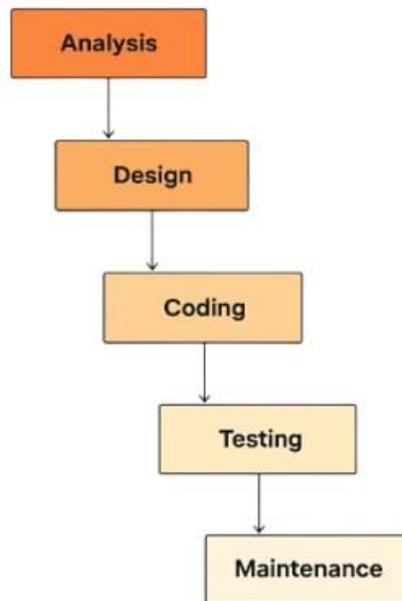

Figure 1. Waterfall Method

1. Analysis
   This stage is conducted thru observation, interviews, and literature studies to identify functional needs (teacher, alumni, student, news, documentation, and attendance data management) as well as non-functional needs (ease of use, security, and access speed). The analysis results are used as the basis for applying the principles of UX.

2. Design
   System design includes creating software architecture, database structure, and interface design. UX principles are applied thru the design of a simple usage flow (use case diagram), consistent navigation, and a display that is easy for administrators, teachers, and parents to understand.

3. Coding
   The implementation phase is carried out by converting the system design into program code. Application development uses PHP 8.0+ (Native PHP) as the main programming language and MySQL as the database. The interface is built using Bootstrap 4, with jQuery and DataTables support to enhance interactivity and ease of data management. The system is running on an Apache server thru the local development package XAMPP. At this stage, each module, including school data management, attendance recap, and WhatsApp notification integration, is implemented and tested in stages to ensure it aligns with the established design and UX principles.

4. Testing
   The testing phase is conducted to ensure that the system functions according to specifications. Functional testing is performed using Black Box Testing to check if each feature functions correctly according to the expected input and output. Additionally, UAT was conducted involving (admins, teachers, parents) to assess the system's suitability to requirements. As part of the UX evaluation, this study uses the SUS to measure the ease of use, efficiency, and comfort of users (admins, teachers, parents).

5. Maintenance

   The maintenance phase is carried out after the application is officially used by Samirejo 3 Elementary School. System maintenance includes feature updates as needed by the school, bug fixes found during use, and performance improvements to keep the application relevant and optimal. With regular maintenance, the application is expected to continue supporting school operations, increase work effectiveness, and ensure smooth and sustainable data management.

4. Results and Discussion

Functional Requirements

Functional requirements are requirements that contain the functions that can be performed and what information is produced by the system, including how the system should react to certain inputs and how the system behaves in certain situations [5]. The functional requirements for this system are:

System Design

1. Use Case Diagram

   A Use Case is a modeling tool for the behavior of the information system to be created. A Use Case describes an interaction between one or more actors and the information system to be built. So, it can be said that a Use Case is a sequence of interconnected interactions between a system and an actor [12]. The Use Case Diagram for the Samirejo 3 Elementary School platform can be seen in Figure 2.
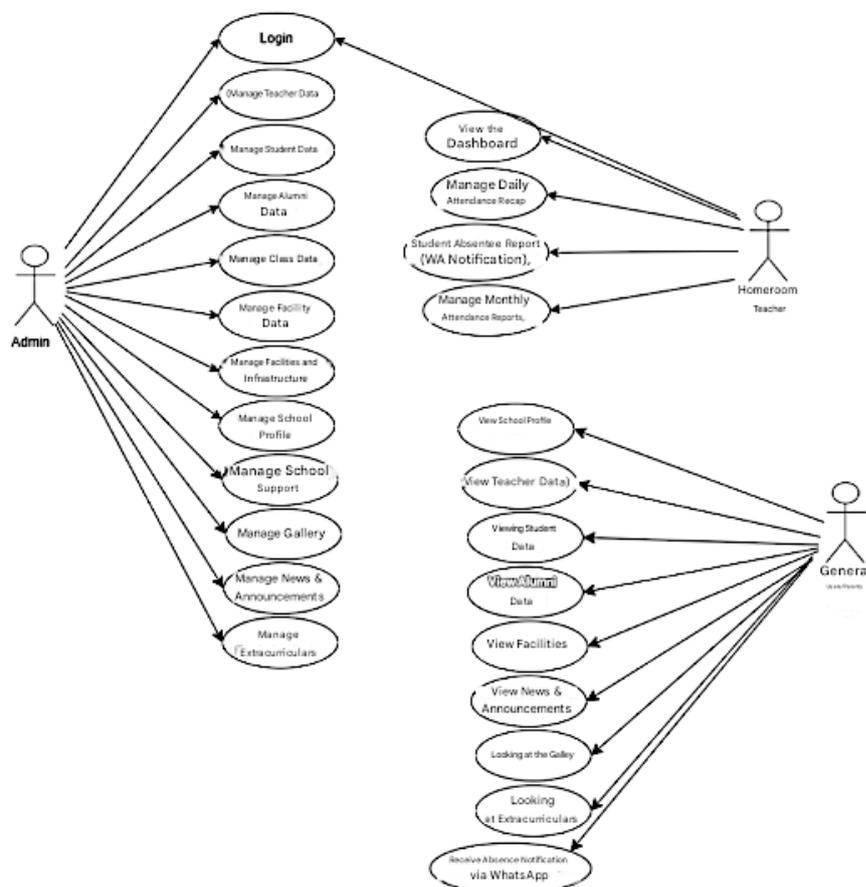

Figure 2. *Use Case Diagram* Platform Samirejo 3 Elementary School

User Interface

This section discusses the user interface of the Samirejo 3 Elementary School platform, which was created as a solution to simplify the process of information delivery and data management.

1. Login Page

   The login page is designed as the main entry point to the system, used for user authentication. This page consists of an admin login and a class teacher login, where you enter the username and password that were created to access the system.
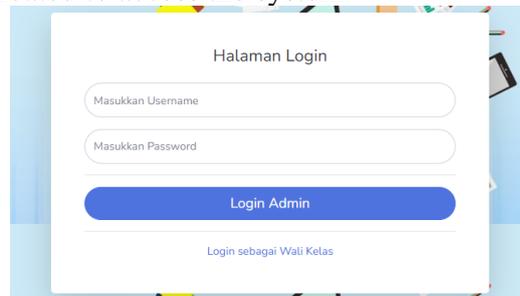

Figure 3. Login Page

2. User Data

   Page This User Data page consists of teacher data, student data, and alumni data. On this page, administrators can add, view, edit, and delete data. This page displays information related to teacher data, student data, and alumni data on the website. In this teacher menu, there is a form for creating a username, password, and class advisor, which are used for logging in to input student attendance. In the student menu, there is a form for filling in the parent's name and WhatsApp number, which is used to send automatic notifications if a student is absent without explanation/alpha.

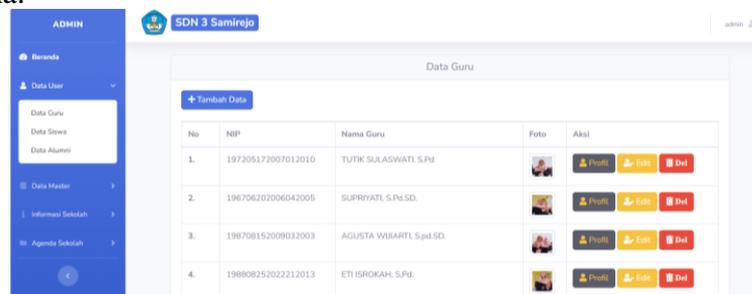**Figure 4.** User Data Page

3. Homeroom Teacher Dashboard Page

   The dashboard page is the homeroom teacher's main page. This page displays the total number of students, the number present today, the number with permission/sick leave, and the number absent.

Figure 5. Homeroom Teacher Dashboard Page

4. Student Attendance Recap Page
    This page is a daily attendance recap carried out by the class teacher by clicking the available buttons: present, excused, sick, and absent. If a student is absent without explanation, the system will automatically send a notification via WhatsApp to the parent.
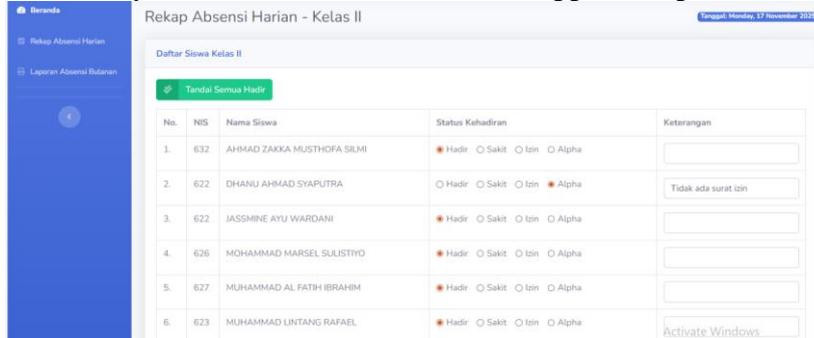

Figure 6. Student Attendance Recap Page

5. Student Absent Without Explanation Report Page
    This page is a report of students who are absent (Alpha), and it functions to send automated message notifications to parents by clicking the "Send WA" button.

Figure 7. Absent Student Report Page
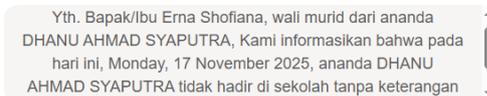

Figure 8. Automatic Message

System Testing

1. Black Box Testing
    Black Box Testing is a testing method based on application details, such as the user interface, available functions, and the conformity of the workflow with the system desired by its designer [13]. The results of Black Box Testing can be seen in Table 2.

Table 2. Black Box Testing Results

No	Tested Menu	Test Steps	Expected Results	Status
1.	Login	User login involves entering a username and password.	Login successful and the user will be redirected to the dashboard corresponding to their role (admin/homeroom teacher).	Successful
2.	User Data Menu	The admin adds, edits, deletes, and views data of teachers, students, and alumni.	Data is added, updated, or deleted according to the steps taken.	Successful
3.	Master Data Menu	The admin adds, modifies, and deletes class data,	Data is stored, updated, and deleted according to the processes being executed.	Successful

		facilities, as well as infrastructure.		
4.	School Information Menu	The admin adds, edits, and deletes school profiles, galleries, news, and supporting documents.	All school information data can be managed and displayed correctly.	Successful
5.	School Agenda Menu	The admin adds, edits, and deletes extracurricular data.	School agenda data is stored and changes according to actions.	Successful
6.	Daily Attendance Recap	The homeroom teacher can click the attendance status button (present, sick, excuse, absent).	Able to summarize daily student attendance; if a student is absent without explanation/marked as absent, the homeroom teacher will send an automatic notification via WhatsApp.	Successful
7.	Logout	The user clicks the logout button.	The system logs the user out and returns to the login page.	Successful

2. UAT

UAT is the process of direct testing by users in order to obtain evidence of test results and demonstrate that the system operates according to requirements [14]. The UAT testing involving 10 respondents will address the questionnaire assessment in Table 4 by providing a rating category from 1-5, which can be seen in Table 3.

Table 3. UAT Assessment Categories

Assessment Category	Answer Value
Strongly Agree	5
Agree	4
Somewhat Disagree	3
Disagree	2
Strongly Disagree	1

During UAT, users were asked to try the system and answer questions in the form of a questionnaire on Google Forms.

Table 4. UAT Questionnaire Assessment

No	QUESTION	ANSWER				
		Strongly Agree ×5	Agree ×4	Somewhat Disagree ×3	Disagree ×2	Strongly Disagree ×1
1.	Does the student attendance summary feature work well and display the data accurately?	8	2			
2.	Are absence notifications sent via WhatsApp timely and as needed?	7	3			
3.	Is the navigation on this school platform easy to use and convenient?	9	1			

4.	Can the school information management process be done quickly and without errors?	7	3
5.	Can this system be accessed according to user access rights (Admin, Teacher, Parent)?	8	2

The total UAT results are:

$$\frac{96\% + 94\% + 98\% + 94\% + 96\%}{5} = \frac{478}{5} = 95{,}6\%$$

So, the overall result of the UAT testing is that this application meets most of the user needs at Samirejo 3 Elementary School, which is considered good based on the functions of the application that have been created, such as ease of use and display comfort. The number of respondents in the UAT testing experiment involved 10 respondents, consisting of administrators, several teachers/homeroom teachers, and several parents.

3. SUS Testing

The SUS method was developed as a Usability testing tool. The primary goal of the SUS is to provide an objective and efficient assessment of the usability level of a system [15]. The testing was conducted thru a survey of 10 respondents, providing 10 questions with answer choices using a scale ranging from strongly disagree (value 1) to strongly agree (value 5), in accordance with the guidelines for the SUS. The results of the SUS questions can be seen in Table 5.

Table 5. Questions and Responses of Respondents for SUS Testing

No	Question	Respondent's Answer									
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
1.	I think that I would like to use this system frequently	5	4	4	5	5	5	4	4	4	4
2.	I found the system unnecessarily complex	3	3	1	2	2	2	2	2	2	2
3.	I thought the system was easy to use	4	4	4	5	4	5	4	5	4	5
4.	I think that I would need the support of a technical person to be able to use this system	2	3	3	2	2	2	2	2	2	2
5.	I found the various functions in this system were well-integrated	5	4	4	5	4	5	4	4	4	4
6.	I thought there was too much inconsistency in this system	2	1	2	2	2	2	2	2	2	2
7.	I would imagine that most people would learn to use this system very quickly	4	4	5	5	4	4	4	4	4	5
8.	I found the system very cumbersome to use	2	2	2	1	2	2	1	2	1	2
9.	I felt very confident using the system	4	4	5	4	4	4	4	4	4	5
10.	I needed to learn a lot of things before I could get going with this system	1	3	3	2	2	2	2	2	2	2

Next, to determine the SUS score on the school platform website, it is necessary to calculate from the answers provided by the respondents. After that, the answers are summed up and then multiplied by 2.5 to get the total score and to find the average score, which can be seen in Table 6.

Table 6. Data of Respondents' Answer Calculations

Respondent	Question										Quantity	Score (Quantity × 2.5)
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
R1	4	2	3	3	4	3	3	3	3	4	32	80
R2	3	2	3	2	3	4	3	3	3	2	28	70
R3	3	4	3	2	3	3	4	3	4	2	31	78
R4	4	3	4	3	4	3	4	4	3	3	35	88
R5	4	3	3	3	3	3	3	3	3	3	31	78
R6	4	3	4	3	4	3	3	3	3	3	30	75
R7	3	3	3	3	3	3	3	4	3	3	31	78
R8	3	3	4	3	3	3	3	3	3	3	31	78
R9	3	3	3	3	3	3	3	4	3	3	31	78
R10	3	3	4	3	3	3	4	3	4	3	33	83
Average score (final result)												**79**

Based on the SUS test results in Table 6 involving 10 respondents (admins, teachers, and parents), with an average score of 79, it can be concluded that this system falls into the Good category.

5. Conclusions.

This research resulted in a web-based school platform that supports various operational and information needs at Samirejo 3 Elementary School. The system built not only provides digital attendance recap features and automatic notifications via WhatsApp, but also includes school data management such as teacher, student, alumni information, school profile, news, activity documentation, and school agenda. This integration of information and operational features allows administrative processes to run faster, be centralized, and easily accessible to all users. The UX evaluation using the SUS method showed a score of 79, placing it in the Good category. This indicates that the system is easy to use, easy to understand, and well-received by administrators, teachers, and parents. The User Acceptance Testing (UAT) results of 95.6% reinforce the finding that the system meets the school's functional requirements and can be used in daily operations. The limitations of the study lie in the still limited number of respondents and the evaluation that has not yet measured long-term usage experience. Further research could incorporate academic features, digital report cards, grading systems, two-way notification integration, and advanced UX testing like UEQ to gain a deeper understanding of user experience.

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