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DESIGN OF INFORMATICS EDUCATION PROGRAM LABORATORY SCHEDULING INFORMATION SYSTEM PGRI UNIVERSITY OF WEST SUMATERA

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Abstract
The preparation and writing of the practicum lecture schedule in the Informatics Education computer laboratory has not been optimal. In addition, the laboratory loan process has not been efficient in terms of time, because lecturers and students have to contact and come directly to the laboratory. The purpose of this study was to design and test a laboratory scheduling information system for the informatics education study program at the University of PGRI, West Sumatra, using the Software Development Life Cycle (SDLC) method. This research resulted in an information system that can help labor technicians, lecturers, students and related stakeholders. The results of beta testing research on expert validation obtained an average validation of 87.4% with very good information and the user assessment questionnaire obtained an average value of 89.8% with very good information.
Keywords: Information Systems, Scheduling, Laboratory, Technology.

Abstrak
Penyusunan dan penulisan jadwal perkuliahan praktikum di laboratorium komputer Pendidikan Informatika belum optimal. Selain itu, pada proses peminjaman laboratorium belum efisien dalam segi waktu, karena dosen dan mahasiswa harus menghubungi dan datang langsung ke laboratorium. Tujuan penelitian ini untuk merancang dan menguji sistem informasi penjadwalan laboratorium program studi pendidikan informatika Universitas PGRI Sumatera Barat dengan menggunakan metode Software Development Life Cycle (SDLC). Dari penelitian ini menghasilkan sistem informasi yang dapat membantu teknisi labor, dosen, mahasiswa dan stake holder terkait. Hasil penelitian pengujian beta pada pada validasi tenaga ahli memperoleh validasi rata-rata 87,4% dengan keterangan Sangat Baik dan kuesioner penilaian pengguna memperoleh nilai rata-rata 89,8% dengan keterangan Sangat Baik.
Kata kunci: *Sistem Informasi, Penjadwalan, Laboratorium, Teknologi.*

1. INTRODUCTION

Technology The scheduling of computer laboratory practical sessions in the Informatics Education program is currently only accessible through the Integrated Information System (IIS) and manually written on the whiteboard in the laboratory office. Although this process provides accurate information, it is not yet optimal and efficient for specific practical learning situations. For instance, there is a need for quick access to information about available empty laboratories and substitutes for classroom activities.

In the current laboratory booking process, both faculty members and students are

required to physically visit the laboratory to communicate their booking needs to the computer laboratory technicians. This method makes the booking process inefficient and may lead to duplicate data entries. Additionally, it complicates the task for laboratory technicians to determine temporary schedules for laboratory usage, which can frequently change. Even though the schedule for the usage of the Informatics Education laboratories can be viewed on the Integrated Information System (IIS) of Universitas PGRI Sumatera Barat, a dedicated Laboratory Scheduling Information System is still necessary to facilitate faculty members, students, and especially laboratory technicians in accessing the laboratory usage schedule.

Hence, there is a need for a system, specifically a web-based scheduling information system. According to Ayu and Sholeha (2019), web-based scheduling information systems aim to simplify the input, search, and management of class schedules for administrators. Such scheduling systems can establish rapid connectivity, ensuring that students and educators can access the required information promptly. Rahman et al. (2017) explain that the advantage of an information system lies in its ability to assist and streamline data management processes, including adding, modifying, and deleting data.

This research aims to formulate the Design of the Laboratory Scheduling Information System for the Informatics Education Program at Universitas PGRI Sumatera Barat and to test the Laboratory Scheduling Information System for the Informatics Education Program at Universitas PGRI Sumatera Barat.

2. METHOD

This research on the web-based Laboratory Scheduling Information System design for the Informatics Education program at Universitas PGRI Sumatera Barat was conducted using the Software Development Life Cycle (SDLC) method with an Iterative model. The Iterative model comprises six stages: planning, design implementation, verification, and maintenance.

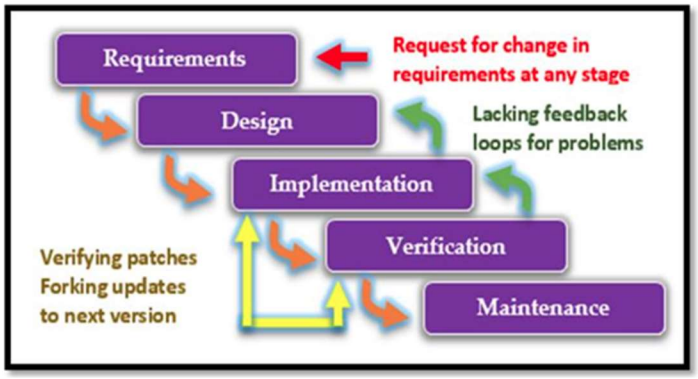


Figure 1. iterative model (Abdussalaam & Mardiansyah Ramadhan, 2019)

Based on Figure 1, the iterative model consists of six stages: requirements, design, implementation, verification, and maintenance. In the requirements stage, the planning and system analysis processes can be observed as follows.

The planning stage for this system design involves observing the scheduling system currently used in the Informatics Education laboratory at Universitas PGRI Sumatera Barat. This includes observing and monitoring the environment, identifying problems, and evaluating the weaknesses and strengths of the observed system. The identification of the system needed by laboratory technicians and users, as well as the feasibility study of the proposed system, are conducted during this stage.

The system analysis stage aims to identify the problems and challenges in the existing scheduling Information System to overcome the issues faced. The current system will be transitioned to a web-based information system to simplify scheduling management and laboratory booking processes.

The system design stage starts with designing the database, creating class diagrams, defining table structures, and then designing interfaces, including login and home interfaces. UML (use case diagram, activity diagram, sequence diagram, class diagram) is utilized in this system design process.

The database design involves determining the content and arrangement of data needed to support the system design according to user requirements. The designed tables include users, schedules, labs, lecturers, courses, sessions, and exams. Interface design aims to facilitate the application implementation and user experience. This section explains the interface design of the Scheduled Scheduling Information System.

The system testing stage is conducted to determine if the designed system can function optimally. During this stage, aspects such as user-friendliness and the achievement of system goals from the initial system design are observed. If errors are found from the initial to the final stage, they must be corrected or revised entirely. System testing in this system is divided into two types: alpha testing (whitebox testing and blackbox testing) and beta testing. The implementation stage involves transforming the system design into operational code ready for deployment.

3. FINDINGS AND DISCUSSION

Implementation System

There Implementation of this system is the process of implementing the design of the system that has been designed in the previous chapter, to streamline the system that has been created. The results of this implementation stage are the final stage in describing the system, namely making the system so that it can be operated. Implementation with software using a browser application and supporting operating system. Implementation with hardware is used to support the scheduling information system in the laboratory of the Informatics Education Study Program, PGRI University of West Sumatra, namely smartphones (Android and iOS), PC (Personal Computer), Laptop.

The following is the system implementation with the system view:

1. Initial System Display



Figure 2. Main dashboard

In Figure 2 the main page at the top provides information regarding the title, date, logo, image slides, list of names of study program leaders, login button, and number of visitors.

2. Login page display

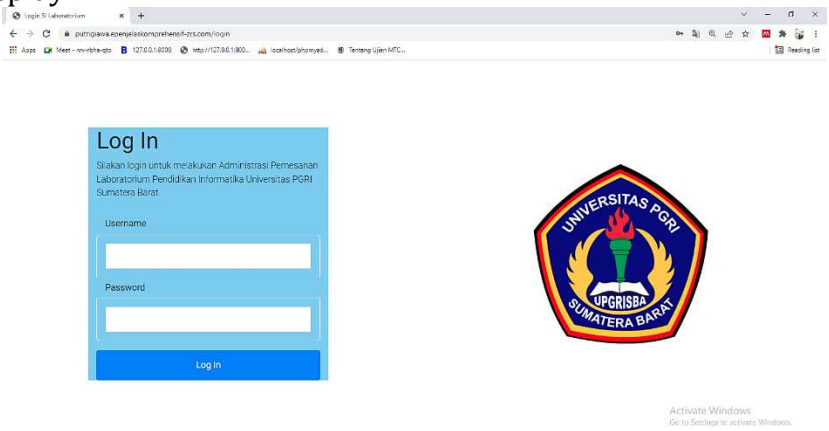


Figure 3. Display login

Figure 3 explains that to enter the laboratory lending information system, users must enter their username and password first and then click the login button.

3. Main page admin

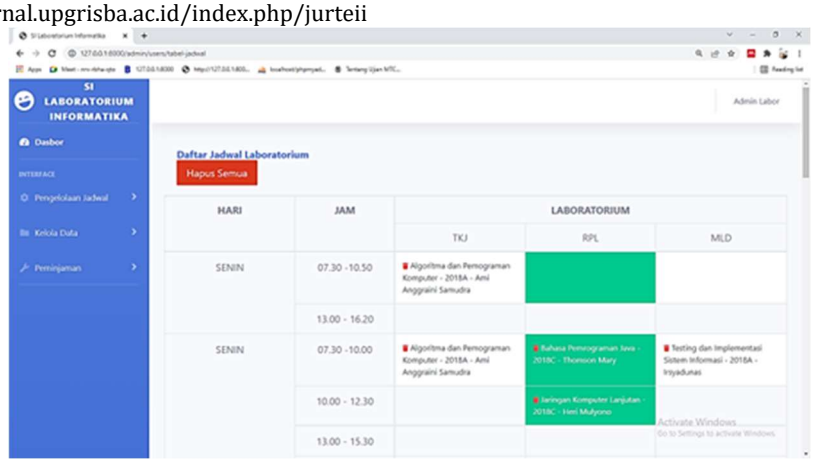


Figure 4. Main page admin

In Figure 4 above the admin can click on the menus available on the left of the menu so that the admin enters the existing menu page.

a. Dashboard: to display the laboratory schedule table.
b. Schedule Management: menu that will display the Schedule Settings page.
c. Manage Data: menu for managing data that has been entered.
d. Borrowing: menu that will display the Labor Borrowing menu.

4. Schedule settings page

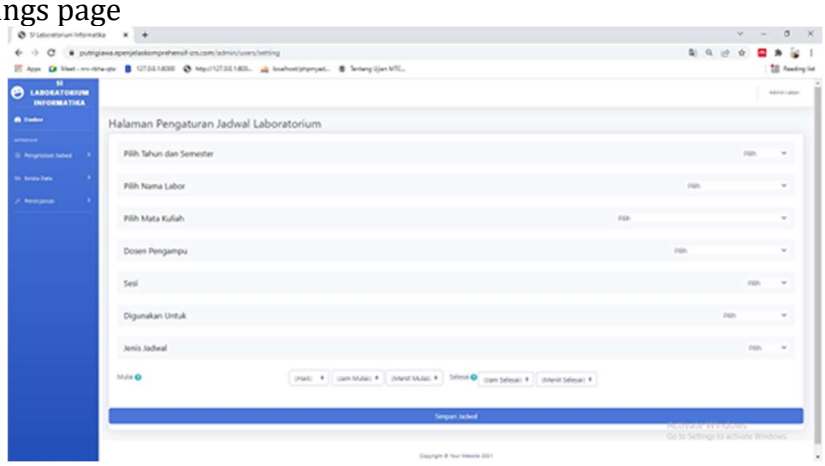


Figure 5. Schedule settings page

In Figure 5 the admin can input data based on the data needed for the schedule list which will be displayed on the main page.

a. Save Schedule button: to save data.

5. User settings page

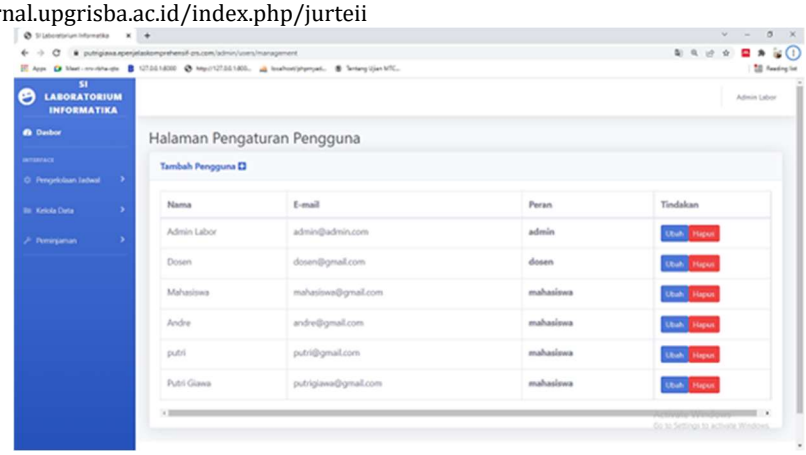


Figure 6. User settings page

In Figure 6, the image above displays the admin can click the button available on the User Settings page.

a. Add User: functions to add system users who can carry out the laboratory loan process.

b. Edit button: functions to change the name, e-mail and user role.

c. Delete button: functions to delete a user account.

6. Main page users

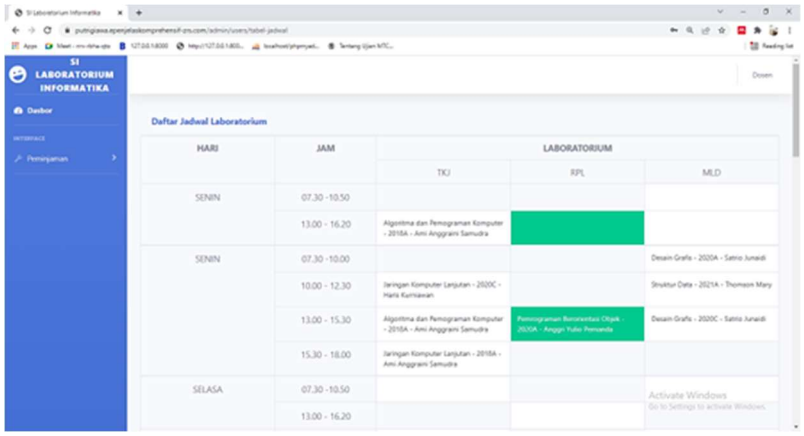


Figure 7. Main page users

In the Figure 7 display, Users (Lecturers and Students) can click on the menu available on the left of the menu so that Users (Lecturers and Students) enter the existing menu page, namely the Loan Menu (a menu that will display the Labor Loan menu).

7. Labor users loan page

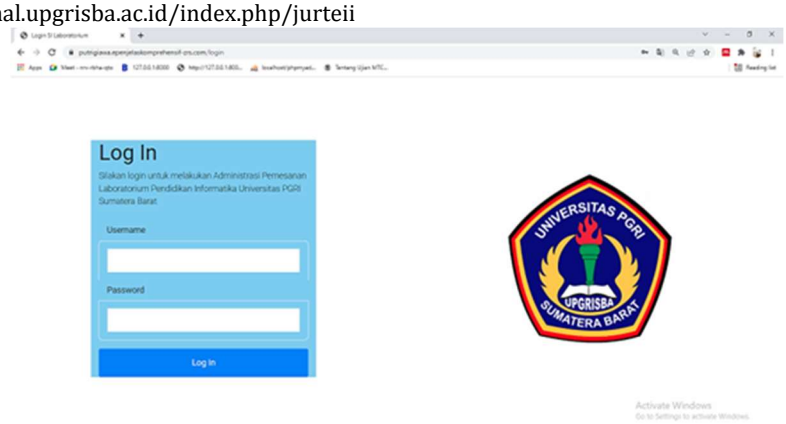


Figure 8. Labor uses loan page

In the Figure 8 display, users (lecturers and students) can fill in the columns by selecting several input options whose data will be entered into the laboratory schedule list.

Pengujian Sistem

A. Pengujian alpha

1. Pengujian whitebox testing

Laboratory information system testing has been carried out using the white box method, where the logical flow in the information system is in accordance with the website structure, and by using flowcharts, determining cyclomatic and system test cases. This testing stage is in line with the opinion of (Suprapti et al., 2017) that white box testing has testing stages that start from analyzing the system based on flowcharts, creating flow graphs, calculating cyclomatic complexity based on independent paths, and performing case tase.

2. Pengujian blackbox

Black Box testing results, the developer has tested 19 test menus and 28 expected results with valid results, which indicates that the test scenario in the information system matches the expected results and the menus tested get valid results. Black Box testing shows that the application is able to handle data, both valid data and invalid data with a percentage of success and the tester does not need to have knowledge of a particular programming language.

B. Pengujian beta

1. Pengujian oleh tenaga ahli

Kriteria	Persentase Nilai (%)	Keterangan
Fungsionality	80,5	Sangat Baik
Reliability	83,3	Sangat Baik
Usability	85,7	Sangat Baik

Eficiency	91,7	Sangat Baik
Maintainability	87,5	Sangat Baik
Portability	95,8	Sangat Baik
Rata-Rata	**87,4**	**Sangat Baik**

In the table above, the average beta test by experts on the labor scheduling information system produced an average assessment percentage of 87.4% with very good results (Table 24). So, it can be said that in terms of functional and non-functional system flow, the scheduling information system is valid for use. So, this system can be used by the informatics education study program laboratory at PGRI West Sumatra University to provide information regarding labor schedules and simplify the process of borrowing laboratory use. This is in line with the opinion (Panjaitan et al., 2021) that to test the feasibility of the product that has been designed, the development product and questionnaire are submitted to the validator to test its feasibility.

2. Pengujian oleh pengguna

Kriteria	Persentase Nilai (%)	Keterangan
Tampilan Website	87,5	Sangat Baik
Menu Website	89,3	Sangat Baik
Isi (Konten) Website	89,3	Sangat Baik
Kemudahan Pengguna	90,3	Sangat Baik
Kemanfaatan	92,8	Sangat Baik
Rata-Rata	**89,8**	**Sangat Baik**

In the table above, the average beta test by users on the labor scheduling information system resulted in an average percentage assessment of 89.8% with Very Good results (Table 25). So, it can be said that in terms of functional and non-functional system flow the scheduling information system is good for users. So, the scheduling system can be used by the informatics education study program laboratory at PGRI West Sumatra University to provide information regarding labor schedules and simplify the process of borrowing laboratory usage for system users. This is in line with the opinion (Putri et al., 2018) that beta testing is testing based on feedback taken from application users.

4. CONCLUSION

Based on the results of scheduling information system research that researchers have carried out, this research produces a website-based Laboratory Scheduling Information System for the Informatics Education Study Program, PGRI University of West Sumatra which can help laboratory technicians, lecturers, students and related stakeholders in

optimizing laboratory scheduling and borrowing.

The tests used in this research are Whitebox Testing, Blackbox Testing, and Beta Testing. From the results of beta testing on validation, experts obtained an average validation of 87.4% with Very Good information and the user assessment questionnaire obtained an average score of 89.8% with Very Good information.

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