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DESIGN AND DEVELOPMENT OF A LARAVEL-BASED ACADEMIC GRADING SYSTEM AT PIKSI GANESHA POLYTECHNIC

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Abstract
This research aims to design and develop a web-based student grading information system using the Laravel framework within Piksi Ganesha Polytechnic. The system is developed to facilitate lecturers in inputting student grades according to the deadlines set by the academic department. The development method applied is the Waterfall model, which includes the stages of requirements analysis, system design, implementation, testing, and maintenance. System testing was carried out using the black-box testing method to ensure that each feature functions as intended. The results showed that this system is capable of assisting lecturers in assessing students in a more structured and timely manner. The main features developed include grade input, input deadline settings, automatic notifications when only three days remain, forms that are automatically disabled once the deadline passes, and a progress bar to help lecturers monitor grade input completion for each class. Based on the trial results, the system received positive responses from users as it enhances efficiency and discipline in the grading process. The implementation of this grading information system is expected to support academic management in a more effective, transparent, and accountable manner, as well as become a relevant technological innovation to promote digital transformation at Piksi Ganesha Polytechnic, thereby improving the quality of integrated and sustainable academic services.

1.0 INTRODUCTION

The development of information technology has brought significant changes in the academic management process in higher education [1]. One of the important aspects of academic management is the student assessment system[2], which has been mostly done manually on paper or using simple spreadsheet applications [3].Such manual processes have drawbacks in terms of efficiency, accuracy, and data security [1]. This research aims to develop a value information system based on Laravel, a PHP framework that supports the development of web applications with MVC (Model-View-Controller). architecture This system is designed to assist lecturers in input grades according to the schedule that has been determined by the academics, including time limits on grade input that will be automatically informed[4].

The limitation of this study is that the system is only focused on the features of grade management, bar progress and time limitation of grade input by lecturers, without covering academic management as a whole. The system development method used is the waterfall model, which includes the stages of analysis, design, implementation, testing, and maintenance[5]. Previous research has shown that the implementation of web-based information systems can increase efficiency and speed in the academic data processing process However, it is still rare to find a system that specifically regulates and notifies the deadline.

The novelty of this research lies in the integration of a deadline validation feature with time-based automatic notifications and the deactivation of the grade input form when the deadline has passed. This combination of features ensures that lecturers input grades on time, improves discipline in the assessment process, and reduces delays in academic data processing. Unlike previous research[6], which only developed a student grading information system without implementing time constraints, this study introduces an innovation by providing an integrated automatic reminder and input control system to address the recurring issue of late grade submissions in higher education institutions.

The implementation of this system is expected to support academic management at Piksi Ganesha College to become more effective, integrated, and sustainable. Additionally, this research contributes to promoting digital transformation in academic services by enhancing efficiency, transparency, and accountability in the student assessment process. The developed system is expected to become a relevant technological innovation to improve the quality of academic services in higher education.

2.0 THEORETICAL

2.1 Academic Information Systems

An academic information system is a computerized application designed to manage academic processes in universities, such as student data management, lecture schedules, and assessments [7]. This system aims to improve the efficiency, accuracy, and accessibility of academic data, as well as facilitate interaction between students, lecturers, and campus administration [8].

2.2 Student assessment

Assessment is an important part of the learning process that reflects the achievement of student learning outcomes. In the context of college, assessments generally include several components such as participation, assignments, midterm exams (UTS), and final semester exams (UAS). This process requires transparency and timeliness so that the results provided are objective and accountable[9].

2.3 Framework Laravel

Laravel is an open-source PHP framework that is popular for its elegant and efficient approach to building web applications [10]. Laravel implements a Model-View-Controller (MVC) architecture that separates application logic, display, and data processing [11]. Features such as routing, blade templating, migration, and Eloquent ORM make Laravel the right choice for the development of a web-based academic information system [12].

2.4 Deadlines in The Academic System

A deadline refers to a specified end time to complete a particular task within a system. In academic contexts, implementing deadlines ensures that lecturers and students fulfill their responsibilities within the schedules set by the institution. deadlines improve time management and user productivity, promoting disciplined task completion[13].

2.5 Automatic Notifications in Academic Systems

In the grade information system, this reminder is used to notify lecturers about the deadline for input grades to fit the academic calendar schedule. This mechanism can reduce delays in filling grades, improve lecturers' work efficiency. time-based notifications enhance user discipline and timely task completion[14].

2.6 Progress Bar in the Academic System

The implementation of progress bars in web-based applications not only increases user productivity and motivation, but also provides a better interaction experience as users can see the extent to which the process is progressing[15]. A progress bar is a user interface (UI) element used to display the completion status of a process to users. In academic systems, progress bars assist lecturers in monitoring how far they have completed grade input for each class they teach.

3.0 METHODOLOGY

This study uses the Software Engineering by the *Waterfall*, since this method allows the development of the system to be carried out gradually and systematically from start to finish. The waterfall model has five main stages[16], that is:

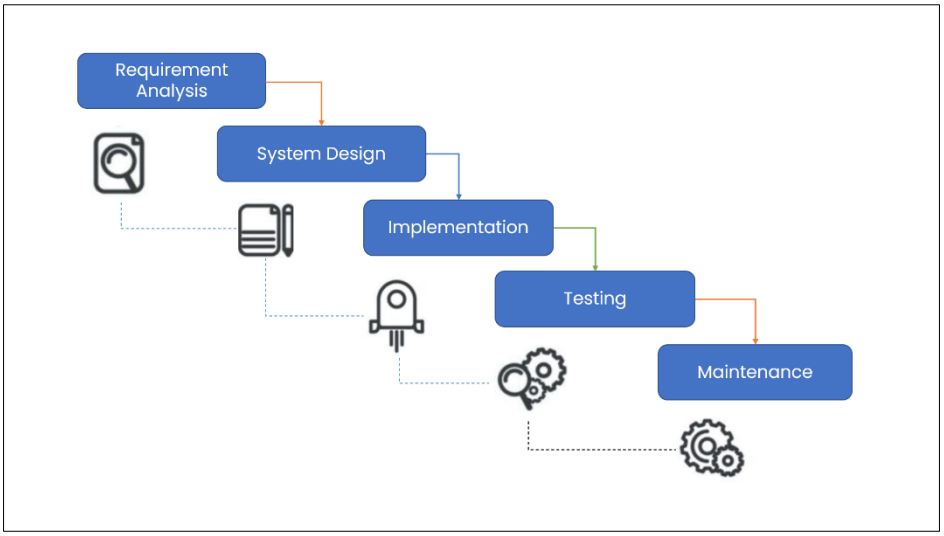

Figure 1. Model waterfall

3.1 Requirement Analysis

This initial stage is carried out to identify the needs of users [17], especially lecturers and academics. The analysis includes a study of the value input process that is running and the problems that arise, such as input delays and the absence of a reminder system.

3.2 System Design

Once the need is identified, the design of the database structure, user interface (UI), and system workflow is carried out using tools such as flowcharts and wireframes [18]. The system design is customized to support value input features and automatic deadline reminders.

3.2.1 System Process Flow

The flow of this system process starts from the academic who makes the lecture schedule and determines the deadline for filling in grades. This schedule can then be accessed by lecturers through the system. Lecturers can only input grades if they are still within the specified time limit. The system will automatically check if the deadline is close (≤ 3 days) and send a notification to the lecturer's dashboard. If the time has run out, the grade input form will be deactivated so that lecturers can no longer input grades.

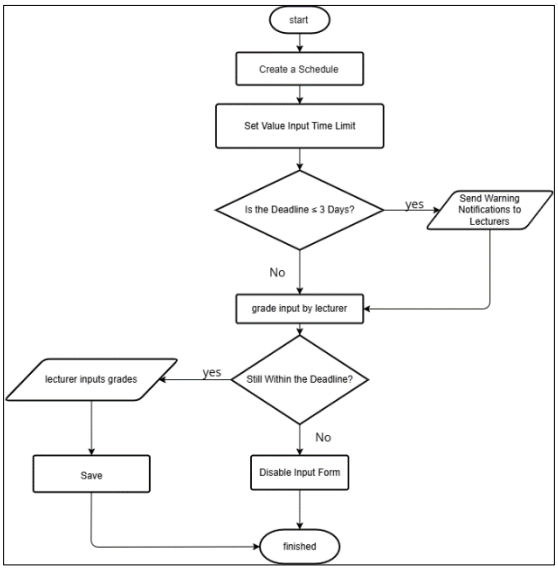

Figure 2. Flowchart of the process of making academic schedules and filling in grades by lecturers

3.2.2 Data Flow Diagram (DFD) Level 0 Student Score Information System

DFD Level 0 (Context Diagram) describes the main processes of the system globally and their interactions with external entities. In this value information system, there are two external entities, namely Academics and Lecturers. Academics provide data in the form of lecture schedules and

deadlines for filling in grades to the system to be managed, while lecturers input student grades through the interface that has been provided. After the score data is inputted, the system will send a deadline notification to the lecturer as a reminder if the deadline for filling in grades is almost up. Student score data input by lecturers will be stored in the Grade Database, while lecture schedule data will be stored in the Eyelashes Schedule Database. Thus, DFD Level 0 maps the data flow between external entities and the system as a whole without displaying the details of the subprocesses that are within it.

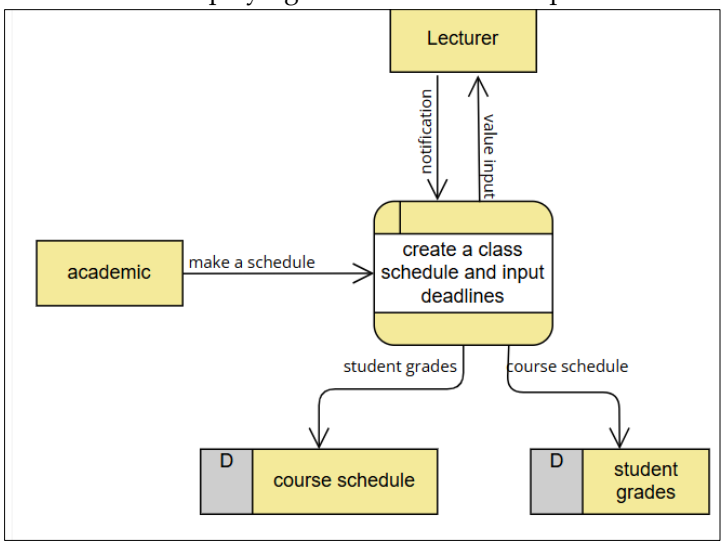

Figure 3. DFD level 0 Value Input Process with time limit

3.2.3 Data Flow Diagram (DFD) Level 1 Student Value Information System

DFD Level 1 is a decomposition of the main process at Level 0 into several more detailed subprocesses. In this grade information system, Academics input lecture schedules along with the deadline for filling in grades into the system, which is then stored in the Schedule Database. Furthermore, lecturers input student scores through the form provided in the system. After the value is inputted, the system will validate the deadline to ensure that the value input is still within the predetermined time limit. If the remaining time is less than or equal to three days, the system will send a deadline notification to the lecturer as a warning. Student grades that have been input and validated will be stored in the Grade Database to be processed and displayed in the student grade recap. With this Level 1 decomposition, data flows, actors, and system processes can be seen in more detail, making it easier to develop and implement programs according to user needs.

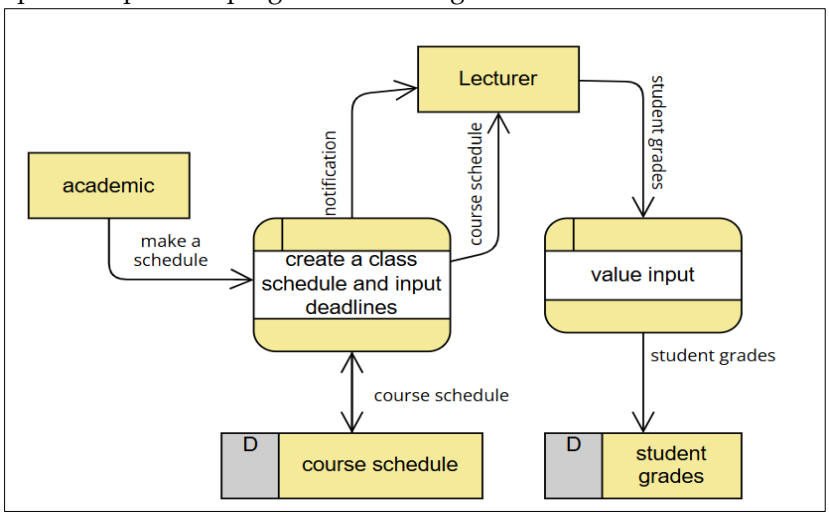

Figure 4. DFD level 1 Value Input Process with time limit

3.2.4 Entity Relationship Diagram (ERD) Value Information System

The Entity Relationship Diagram (ERD) shows the database structure of the system. The main entities in the system include, Lecturer Grades, Students, Student Lecture Schedules, and

Notifications. The relationship between entities illustrates that the lecturer teaches in a certain lecture schedule, students receive grades based on that schedule, and the system will provide automatic notifications to lecturers when the deadline for input grades is approaching.

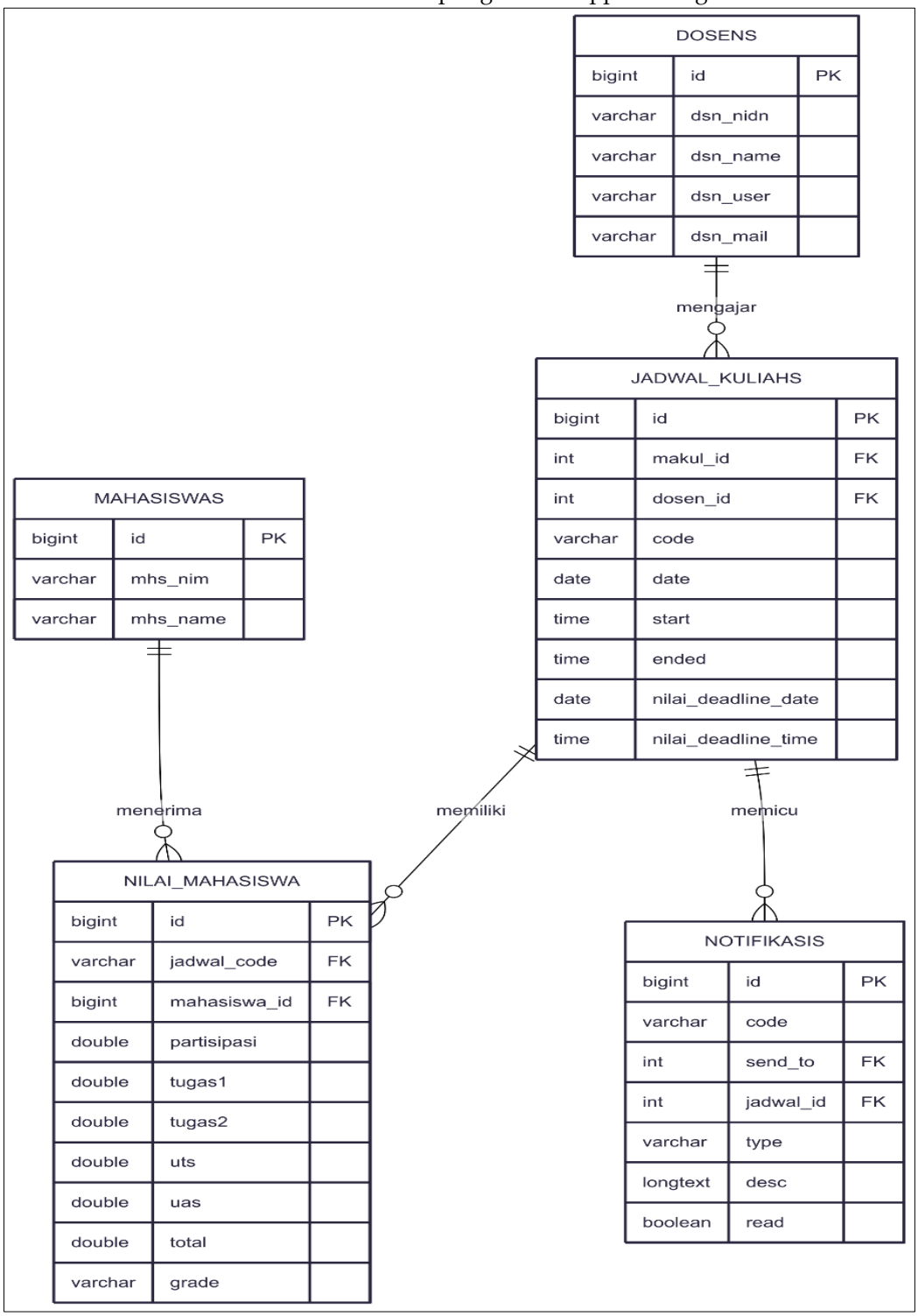

Figure 5. E.R. Information System for Students

3.3 Implementation

This stage is the process of coding the system based on the design results. The Laravel framework is used in backend development, while the interface is built with Blade templating and Bootstrap [19]. This system supports multi-role authentication, namely lecturer academics, students and student value management.

3.4 Testing

The test is carried out using the black-box testing method, which is by trying every feature from the user's side without checking the program code. The focus of testing lies on value input functions, deadline reminders, and deadline validation[20].

Table 1. System Plan Test

NO	TESTED FEATURES	INPUT	EXPEDITION
1	Input value when active	Open value form	Successfully saved value
2	Input value after the deadline	Form value in auto-close	Unable to fill in the value
3	Deadline notification view	Date ≤3 days from deadline	Notifications appear on the dashboard
4	Login every role of lecturer, academic, student successfully	Username and password are correct	Successfully log in to the dashboard of each role
5	Login every role lecturer, academic, student failed	Incorrect username and password	Login in decline
6	Value input progressbar	Input Partial Value	Progress refers to the percentage of value inputs

3.5 Maintenance

Once the system is implemented and tested, maintenance is carried out to fix the bugs found as well as adjust to new needs that may arise.

4.0 RESULTS AND DISCUSSION

This research produced a web-based grade information system using the Laravel framework, which makes it easier for lecturers to fill in grades systematically and on a scheduled basis. One of the main advantages of this system is the feature of the time limit for grade input determined by the academic party. This feature allows real-time time control, thus encouraging lecturer discipline in the assessment process. One of the excellent features in this system is the ability to limit the time of grade input by lecturers. The following is a list of the main features developed:

Table 2. System feature table

No	Feature Name	Short description
1	Value Input	Lecturers can fill in the value of student participation, assignments, UTS, and UAS.
2	Value Input Deadline	A time limit set by academics for grade input.
3	Deadline Notifications	A notification appears on the lecturer's dashboard if there is ≤ 3 days left.
4	Forms are automatically disabled	The system automatically disables the application form if the deadline is passed.
5	Login with multi roles	Login can be in various roles, namely academics, lecturers, and students
6	Progress bar	Lecturers can see the progress of input the grades of each class they teach

The system has been tested using Blackbox's testing method to ensure each feature runs correctly. The test results are presented in the following table:

Table 3. Feature Testing (Blackbox Testing)

No	Tested features	Input	Expectation	Actual results	Status
1	Input value when active	Open value form	Successfully saved values	Successfully saved values	Succeed
2	Input value after the deadline	Form value automatically closes	Can't fill in the value	Form is not accessible	Succeed

3	Show notifications	Date ≤ 3 days from deadline	Notifications appear on the dashboard	Notifications appear on the dashboard	Succeed
4	Login every role of lecturer, academic, student successfully	Username and password are correct	Successfully log in to the dashboard of each role	Dashbord of each role	Succeed
5	Login of every role of lecturer, academic, failed student	Incorrect username and password	Login in decline	Login denied, error message appears	Succeed
6	Value input progressbar	Input Partial Value	Progress leads to percentage Filling in the Value	View the progress of filling in the value	Succeed

Here is a comparison between the old grading system and the new system that has been developed using Laravel.

Table 4. Comparison of Old and New Grading Systems

No	Aspects	Legacy systems	New system
1	Value input	Lecturers send grades via email in the form of an excel file then academics input the excel data directly into the application	Lecturers directly input grades into the application because they have multiple roles
2	Checking Deadline	None	Academics can give time to fill in grades to lecturers
3	Progress bar	None	Lecturers can see the progress bar of filling in the grades of each class taught

4.1 Value Input User Interface

The deadline notification feature and progress bar are important elements of this system. The system automatically calculates the remaining days based on the date and time of the deadline for filling in grades determined by the academic party. In addition, the system also calculates the progress of filling in grades in each class by lecturers. If the remaining time is less than or equal to three days, a red warning will appear on the main page of the lecturer's account. This warning serves to remind lecturers to immediately input grades before the deadline ends. With this notification and progress bar, it is hoped that the value input process can be carried out in a more disciplined, structured, and timely manner.

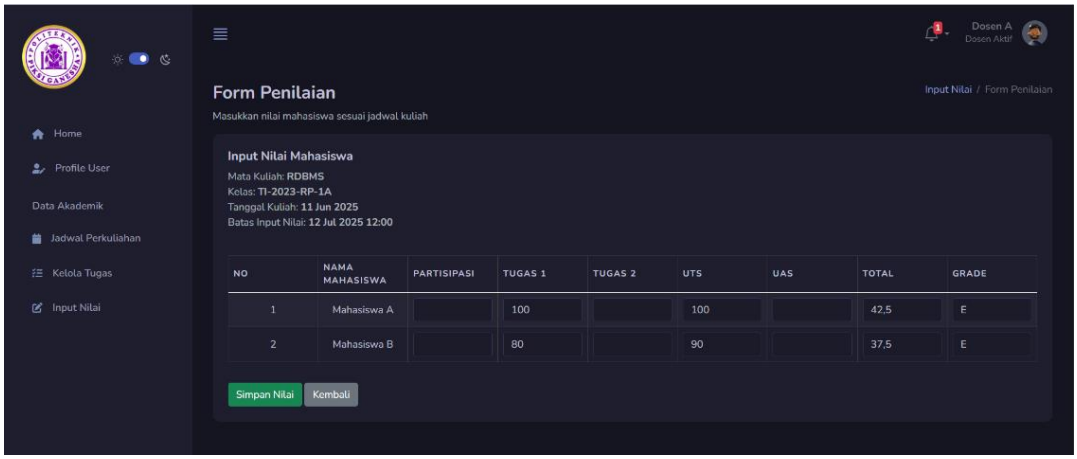

Figure 8. Filling in grades by lecturers

4.2 User interface Deadline Notifications And progress bar

The deadline and progress notification features are important elements of this system. The system will calculate the remaining days automatically based on the date and time of the deadline for filling in grades, and will calculate the progress of filling in grades per class by the lecturer, If there are three days or less left, a red warning will appear on the main page of the lecturer, warning that grades must be entered immediately.

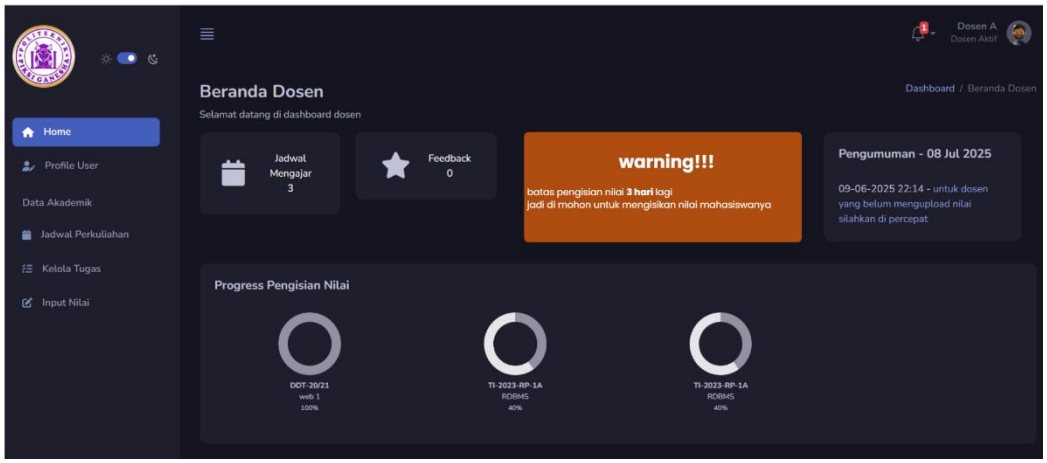

Figure 9. Alert notifications for value fill limits

4.3 interface for filing in values if it has been a long time

The grade submission feature for lecturers is designed with a predefined deadline set by the academic office. Once this deadline has passed, the system will automatically disable access to the grade input form. As a result, lecturers will no longer be able to enter or modify student grades for the respective course. This mechanism is implemented to promote discipline in the grading process and to ensure that all evaluations are completed in accordance with the academic schedule.

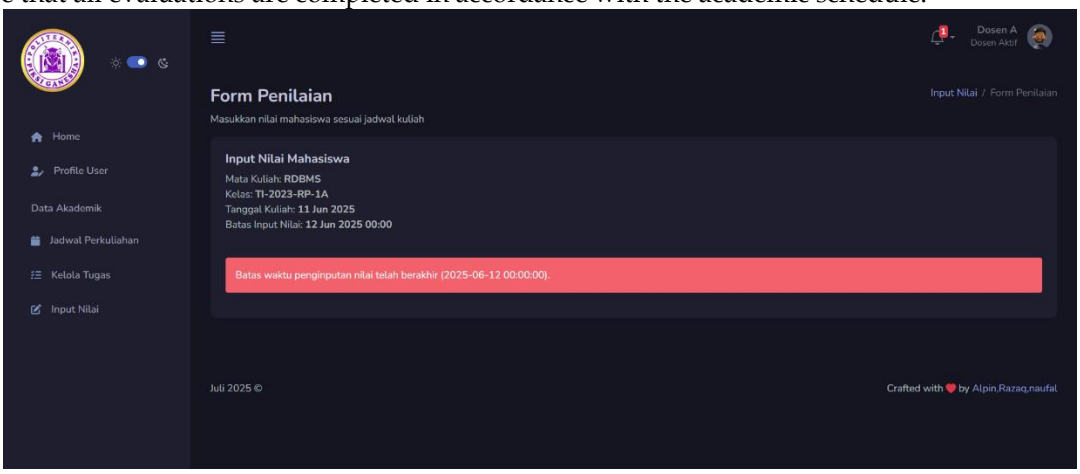

Figure 10. The value input form is closed if it has exceeded the time limit

4.4 Comparison with Old Systems

Before this system was developed, the process of filling in the grades was done manually, such as through an Excel file or paper form. The process is inefficient and prone to delays and input errors. With this developed system, all processes become centralized and monitored, resulting in higher data accuracy and faster turnaround times.

4.5 Advantages and Disadvantages of the System

Based on the results of testing using the black box method, all system functions operated according to user requirements. Testing was carried out on each main feature, including student grade input, deadline validation, automatic notifications when the remaining time for grade input is three days, automatic deactivation of the input form when the deadline has passed, and the progress bar that

displays the percentage of grade input completion per class. The test results showed that the system successfully displayed automatic notifications when there were only three days remaining and disabled the input form once the deadline had passed, ensuring that lecturers could no longer input grades beyond the designated time limit.

In general, the advantages of this system include integration between lecturers and the academic office, an automatic deadline feature that increases lecturer discipline, and a user-friendly interface that simplifies system usage. However, there are still some limitations, such as the lack of integration with other academic modules (for example, the finance system) and the absence of a grade confirmation feature by students to ensure the accuracy of recorded grades.

5.0 CONCLUSION

Based on the results of the development of a Laravel-based value information system within PIKSI Ganesha College, this system is able to support the value input process in a more structured and disciplined manner. One of the important features implemented is the time limit on filling in values. Lecturers can only input grades up to the deadline that has been determined by the academics. After that time is up, the system will automatically close the value input access, thus preventing delays. In addition, the system is also equipped with an automatic notification feature that will remind lecturers when the time to input grades is almost up, precisely three days before the deadline. This notification helps increase lecturers' awareness of the applicable deadlines and encourages timely completion of assessments. Another feature that supports this process is the progress bar that shows how far the lecturer has filled in the grades for each class. This visual display makes it easier for lecturers to monitor the progress of the assessment and provide an overview to the academic community about the overall development of grade input.

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