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Exam Reporting System (Case Study: Faculty Of Engineering, Universitas Islam Riau)

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Abstract— The Exam Reporting System (Case Study: Faculty of Engineering, Universitas Islam Riau) is a reporting system that assists the faculty's leadership (Dean) in recapitulating test files conducted by the test supervisor during exam implementation at the Faculty of Engineering, Universitas Islam Riau. The construction of this system is based on a policy or SOP (Standard Operating Procedure) for the exam implementation defined by the leadership of the Faculty of Engineering, Universitas Islam Riau, with each case study having its SOP. The manual recapitulation method is slow and takes a long time (1-4 weeks). Therefore, an alternative in the form of a system that can speed up and shorten the recapitulation process is required. This system is meant to deliver exam reporting solutions through services. The outcomes of this service procedure (transitioning from a manual to a digital system) will be faster and easier to obtain. Not only that but the system can also be used at any time and from any location as long as you have internet connectivity, making it more efficient and versatile. The system was tested and evaluated using a questionnaire at the Faculty of Engineering, Universitas Islam Riau, and the results were analyzed using the Likert approach. The processing results have an index of 80.5 per cent, indicating that this technology is very suitable for use in the Faculty of Engineering Universitas Islam Riau.

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Keywords—fingerprint, authentication, security, embedded system, smart home

I. INTRODUCTION

Education is an essential component in terms of educating the nation's generation [1]. The Faculty of Engineering, Universitas Islam Riau (UIR), is one of the educational institutions that pay attention to this matter. So many ways and efforts are made to make this a success. One of them is holding an exam related to the evaluation of learning that lecturers and students have carried out, both the Mid-Semester Examination (UTS) and the Final Semester Examination (UAS).

Launching the exam process requires a supervisor who will supervise the ongoing exam, both from the lecturer concerned and other lecturers or employees at the Faculty of Engineering, UIR. However, reporting and recording exams are currently considered inefficient and relatively long because it still uses the manual method. Hence, it takes a long

time, so this method is ineffective. From this problem, a system is needed to facilitate the process of reporting and recording the exam implementation in each study program at the Faculty of Engineering, UIR.

Based on the description above, a test reporting system was built. This system will provide convenience to all elements involved in the exam reporting process in reporting, recapitulating, and monitoring the implementation of exams that take place in each study program. The outputs produced by this system are the exam schedule, minutes, attendance of supervisors, and a recapitulation of the type of implementation and the number of exams that have been verified by the head of the study program.

II. LITERATURE REVIEW

This study refers to several important parts of previous research and is made into a single unit in the form of a web-based system. The built system was generally made to improve the discipline of the exam supervisory lecturers in conducting exam supervision at the Faculty of Engineering, UIR. Then, it will be related to how to decrease the operational costs of higher education, as in the research undertaken by Agus Wantoro in 2016 [2]. In addition, to increase accuracy and reduce the level of forgery of digital documents in the system built, the researchers used the Quick Response Code as validation as in the research of Ambar Safaatun and Rakhmat Kurniawan [3, 4].

Then this system also acts as a lecturer attendance system. However, the presence in question is not a daily attendance. But it is only limited to attendance in supervising the Mid-Semester Examination (UTS) and Final Semester Examination (UAS) conducted by lecturers and employees. It refers to the research researched by Rina Firliana et al. in 2019 [4]. This research also produces reports as outputs to the system. In addition to what is described above, in this study, the examiner uses an easy way to input the minutes, namely by inputting them into the system without having to make it in hardcopy form by using pen and paper, which is inefficient[5].

1. System

The system can be interpreted as a collection or set of elements or variables that are mutually organized, interact, and depend on each other [6].

2. Monitoring

Monitoring is a process of measuring, recording, collecting, processing, and communicating information to assist project management decision-making [7].

3. Website

According to Arizona [8], a website is originally an information presentation service that uses the concept of hyperlinks that make it easier for surfers (a term for computer users who browse information on the internet) to get information by simply clicking on a link in the form of text or images, so information from text or images can be obtained. the picture will be displayed in more detail.

4. Codeigniter

Codeigniter is a PHP framework that is open source and uses the MVC (Model, View, Controller) method to make it easier for developers or programmers to build a web-based application without having to make it from scratch[9].

5. MySQL

MySQL is a database system that is widely used for web application development. Because the data processing is simple, has a good level of security, and is easy to obtain[10].

6. Hypertext Markup Language (HTML)

HTML (Hypertext Markup Language) is a language used to describe the structure of a web page. HTML is used to publish documents online. The introductory statements of HTML are called tags. A tag is enclosed in square brackets (<>). Tags intended for a document or part of a document must be made in pairs. It consists of an opening tag and a closing tag where the closing tag uses an additional slash (/) at the beginning of the tag name [11].

7. Hypertext Preprocessor (PHP)

PHP (or officially PHP: Hypertext Preprocessor) is a server-side script that is added to HTML[12].

8. Javascript

Javascript is a web programming language that is a Client Side Programming Language. Client Side Programming Language is a programming language whose processing is done by the client. The client application refers to web browsers such as Mozilla Firefox, Google Chrome, and others[13].

III. RESEARCH METHOD

The data collection method used in this study was the observation method, namely analyzing and seeing firsthand how the old system was running. This method can produce a better picture when compared to other techniques[14] [15]. Not only that, but to obtain information and SOP (Standard Operating Procedure) on exam reporting at the Faculty of Engineering, Islamic University of Riau, intensive discussions were also held with the leadership of the dean Faculty of EngineeringUIR.

This technique is carried out with the following advantages:

1. Analysis can see firsthand how the old system is running;
2. Able to produce a better picture when compared to other techniques.

This study designed the development of an exam reporting system with the waterfall method. The Waterfall method is a classic approach in software development that describes a linear and sequential development method.

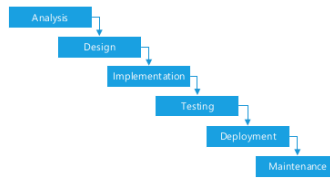


Fig. 1. Waterfall Method

1. Analysis is collecting complete requirements and then analyzing and defining the needs that must be met by the program to be built. This phase must be done in full to produce a complete design.
2. Design is a development that will produce a system as a whole and determine the flow of software to detailed algorithms.
3. Implementation is the stage where the entire design is converted into program code. The resulting program code is still in the form of modules that will be integrated into a complete system.
4. Testing is the stage for merging the modules that have been made, and this test is carried out to determine whether the software made is by its design and ensures the application runs according to function and without errors.
5. Deployment is the stage where the client or user tests whether the system is the approved one.
6. Maintenance is the installation and process of repairing the system as agreed.

The tools and materials used in this research are as follows:

1. Hardware Specifications

The hardware used in the construction of this Exam Reporting System is a computer with the following specifications:

- a. Processor Intel(R) Core(TM) i7-2640M
- b. 120GB SSD
- c. 8GB RAM

2. Software Specifications (Software)

The software used in the making of this Exam Reporting System is as follows:

- a. Operating System: Windows 10 64-bit
- b. Programming Language: PHP, Javascript and HTML
- c. Framework: Codeigniter and Bootstrap
- d. Database: MySQL with XAMPP server
- e. Program Logic Design Application: Microsoft Visio 2016
- f. Text Editor: Sublime Text and Visual Studio Code

In this study, there were five users who could use the designed system, namely:

1. Dean (Faculty) of Engineering UIR
2. Quality Assurance Unit (UPM) Faculty of Engineering UIR
3. Administrative Staff
4. Study Program
5. Examination Supervisor (Lecturer or Employee)

System Design

The following is the design of the exam reporting system that was built:

1. Context diagrams

In setting the context and system boundaries in a modeling, the context diagram for the Exam Reporting System that was built is as follows:

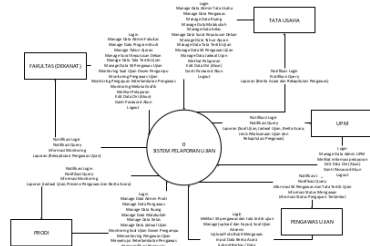


Fig. 2. Context Diagram

2. Hierarchy Chart

Hierarchy Chart is used to provide an overview of the system and sub-systems that explain the processes contained in the main system where all sub-systems that are within the scope of the main system are interconnected with one another, the difference is the level of the process. The following is a hierarchy chart of the system that was built:



Fig. 3. Hierarchy Chart

3. Entity Relationship Diagram

In the Entity Relationship Diagram (ERD) of this Exam Reporting System, it consists of 13 tables, namely *tb_upm*, *tb_fakultas*, *tb_tu*, *tb_prodi*, *tb_prodi_attribut*, *tb_dosen*, *tb_surat_decision*, *tb_school_year*, *tb_ruang*, *tb_class_schedule*, *tb_scheduled*, *tb_schedule*, and *tb_class_studies*.

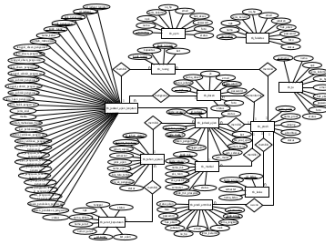


Fig. 4. Entity Relationship Diagrams

IV. RESULT AND DISCUSSION

The Exam Reporting System that was built in this study is a system that can only be accessed by related users who are registered in the system database. To access it, users can login by entering their username, password and login status on the login page as below:

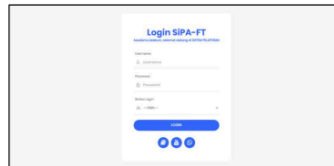


Fig. 5. Login Pages

In its application, this Exam Reporting System is combined with another reporting system that already exists at the research location (Faculty of Engineering, Islamic University of Riau) which is named the Academic Reporting System of the Faculty of Engineering (SIPA-FT) of the Islamic University of Riau. This existing system includes all academic reporting activities that are in place, including reporting on exams which are the topic of this research.

In general, this designed system has several outputs that are generated directly based on the data that has been entered by the relevant user, namely the exam schedule (reporting), the minutes of the exam supervisor, the recapitulation of the exam supervisor reporting, the recapitulation of the type of exam implementation and attendance, invigilator.

1. Exam schedule

The exam schedule (reporting) is a reporting schedule that has been published by the study program with the approval of the Vice Dean for academics and entered into the system by the Administration, so that the exam supervisor can report at the scheduled time and can be printed by the Study Program and the FT Quality Assurance Unit.

A screenshot of a web application showing a table of exam schedules. The table has columns for 'No', 'Materi', 'Waktu', 'Ruang', 'Dosen', and 'Kelas'. The data is organized into rows, with some rows highlighted in blue and others in white.

Fig. 6. Printed Results of the Exam Schedule

A screenshot of a PDF document titled 'RECAPITULASI LAPORAN SUPERVISOR PENGAWAS UJIAN'. It contains a table with columns for 'No', 'Materi', 'Waktu', 'Ruang', 'Dosen', and 'Kelas'. The table is filled with data, and the document is presented in a clean, professional layout.

Fig. 9. Recapitulation of Examination Supervisory Report PDF

2. Minutes of Exam Supervisor

The minutes of the exam supervisor are legal evidence reports that contain attestations and statements that the exam has really been done well. The printing results issued by the system are in PDF format and have used a QR Code as validation of the printed file. The QR Code can be scanned and will generate a link to direct the user to the original printed minutes of the event. The printing of these minutes can be done one by one or all at once.

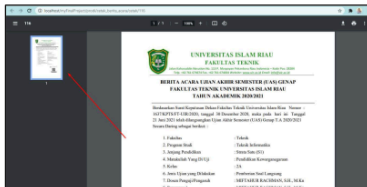


Fig. 7. Print Minutes (Single)

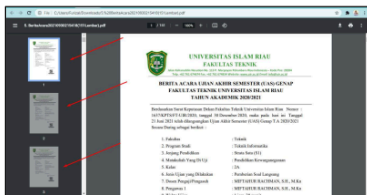


Fig. 8. Print Minutes (Multi)

3. Exam Supervisor Reporting Recapitulation

The recapitulation of the examination supervisor's reporting is a recapitulation of all reports carried out by the examination supervisor in all Study Programs at the Faculty of Engineering, Islamic University of Riau. This output can be printed in two formats, namely Portable Document Format (PDF) and Microsoft Office Excel.

A screenshot of an Excel spreadsheet titled 'RECAPITULASI LAPORAN SUPERVISOR PENGAWAS UJIAN'. It contains a table with columns for 'No', 'Materi', 'Waktu', 'Ruang', 'Dosen', and 'Kelas'. The table is filled with data, and the spreadsheet is presented in a clean, professional layout.

Fig. 10. Excel Exam Supervisor Reporting Recapitulation

4. Recapitulation of Types of Exam Implementation

The recapitulation of the types of examinations is a recapitulation of all types of examinations carried out by the test supervisors in all Study Programs at the Faculty of Engineering, Islamic University of Riau. This output can only be accessed by UPM authorities in PDF format.

A screenshot of a PDF document titled 'UNIVERSITAS ISLAM RIAU' and 'FAKULTAS TEKNIK'. It contains a table with columns for 'No', 'Materi', 'Waktu', 'Ruang', 'Dosen', and 'Kelas'. The table is filled with data, and the document is presented in a clean, professional layout.

Fig. 11. Recapitulation of Types of Exam Implementation

5. Presence of Exam Supervisor

The exam supervisor's presence is a recap of the exam supervisor's presence whose files have been verified by the Program. This output can only be accessed by the Study Program authorities in Excel format.

A screenshot of an Excel spreadsheet titled 'DATA PRESENSI PENGAWAS UJIAN'. It contains a table with columns for 'No', 'Materi', 'Waktu', 'Ruang', 'Dosen', and 'Kelas'. The table is filled with data, and the spreadsheet is presented in a clean, professional layout.

Fig. 12. Presence of Excel Exam Supervisor

Testing Against Users

User testing has been carried out to obtain user ratings of the performance and benefits of this system. In testing, the statistical reporting of the test supervisor for each Study Program can be monitored by the Head of the Engineering Faculty (Dean) of the Islamic University of Riau.

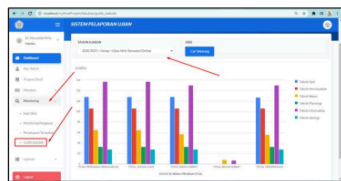


Fig. 13. Graph of Exam Reporting Statistics

Then, to get the level of satisfaction and benefits from this system, users are given a questionnaire of 10 statements on their respective accounts (examination supervisor). The following statements are given in the questionnaire:

- This Exam Reporting System is easily accessible and implemented according to its use;
- The usage procedure applied to this Exam Reporting System does not cause any confusion and is easy to understand;
- This Exam Reporting System can run and work in accordance with the required function in the exam Supervision reporting process;
- The features in this Exam Reporting System are quite good and complete according to reporting needs at the UIR Faculty of Engineering;
- This Exam Reporting System can improve the discipline of exam supervisors in reporting the results of exam supervision that has been carried out at the UIR Faculty of Engineering;
- This Exam Reporting System helps to complete exam reporting quickly and on time;
- This exam reporting system is suitable to be applied during the online learning period;
- This Exam Reporting System can provide convenience in reporting exams when compared to the previous manual system;
- The interface or interface in this exam reporting system is quite good and attractive;
- The service in implementing this Exam Reporting System at the UIR Faculty of Engineering is quite good and responsive.

From the 10 questionnaire statements above, there are 4 responses that can be given by respondents, namely:

- Strongly Agree (SS)
- Agree (S)
- Disagree (TS)
- Strongly Disagree (STS)

All questionnaire statements that have been submitted to respondents are positive, so the score can be formed by labeling the value:

- Strongly Agree (SS) with a score of 4;
- Agree (S) with a score of 3;

- Disagree (TS) with a score of 2 and;
- Strongly Disagree (STS) with a score of 1.

In testing this system, the number of responses taken is the first 10 responses from Respondents (examination supervisors) to the questionnaire given with the following results:

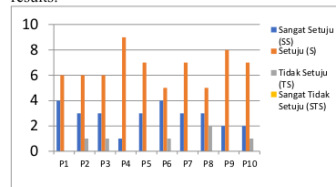


Fig. 14. Questionnaire Graph (10 Respondents)

The results of the questionnaire graph above will be processed using Likert scale processing with the formula:

$$T \times P_n$$

Information :

T = Total number of respondents who chose

P_n = Likert's preferred score

From the Likert scale calculations that have been carried out, the results obtained are:

- Total score = 322.
- Highest possible score = 4 (highest answer score) x 10 (number of respondents) x 10 (number of statements) = 400
- The lowest possible value = 1 (highest answer value) x 10 (number of respondents) x 10 (number of statements) = 100

Interval formula:

$$I = 100 / \text{Total score (Likert)}$$

$$= 100 / 4$$

$$= 25$$

Then the following is the interpretation of the score based on the interval obtained:

Number 0% - 24.99% = Strongly disagree (STS)

Number 25% - 49.55% = Disagree (TS)

Number 50% - 74.55% = Agree (S)

Score 75% - 100% = Strongly Agree(SS)

Index formula (%):

$$\text{Final score} = \text{Total score} / \text{highest total score} \times 100$$

$$= 322/400 \times 100$$

$$= 80.5\% \text{ (Strongly agree)}$$

The final result of the assessment score in the calculation of the questionnaire above is at an index of 80.5%, which means this Exam Reporting System is very good or very agreeable to be applied at the Faculty of Engineering UIR.

V. CONCLUSION

Using a system in academic reporting can increase efficiency in the reporting and data recording process, which initially took a few days to a few weeks to just a few minutes. Then from the questionnaire that has been carried out with 10 sample data, the value of this system is at an index of 80.5%, meaning that this system is feasible to be applied as a medium for reporting and recording exams.

This research is expected to be a reference and guide for readers who experience the same problem with the background of the formation of this research. The author believes there are still many shortcomings, both in terms of reports and programs designed, making it possible for all parties to conduct further research to produce better benefits.

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