An Implementation of Web-Based Payroll Information System in Universitas Proklamasi 45 Yogyakarta

Maria Ulfah Siregar
Informatics Department, Master Program, Faculty of Science and Technology, Universitas Islam Negeri Sunan Kalijaga
Yogyakarta, Indonesia
maria.siregar@uin-suka.ac.id

Devara Eko Katon Mahardika
Student of Informatics Department, Faculty of Science and Technology, Universitas Islam Negeri Sunan Kalijaga
Yogyakarta, Indonesia
devaraekokm@gmail.com

Abstract—Universitas Proklamasi 45 Yogyakarta is a private university which is supervised by a Foundation that has implemented various information systems in various fields of work. However, in the payroll process of the employees are still done manually and have not utilized a computerized system, such as attendance recap, wage recapitulation that is additional salary to basic salary, and the sum of salary received by employees. This makes the payroll process less effective and efficient. This study aims to establish a proposed system that is a web-based information system of employee payroll in the Universitas Proklamasi 45 Yogyakarta with the PHP programming language using Codeigniter Framework and MySQL as its database. The system development method used is the Extreme Programming method. This method was chosen because it promotes intense communication between the client and the system developer so that when there are changes or errors in the system, the developer is always ready to fix it. Extreme Programming also has a simple stage, namely planning, design, coding, and testing. The results of this study are the result of a web-based employee payroll information system that has various actors involved in the management and processing of its data. With this information system, the employee payroll process becomes more effective and efficient, because payroll data is processed and calculated by the system so that it has a high level of data accuracy and does not require a long time in the calculation process.

Keywords-Web Application; Information System; Payroll System; Codeigniter; Extreme Programming

I. INTRODUCTION

Technological advances today are experiencing very rapid development in various fields. This is marked by the implementation of a service system that has been computerized in various agencies and various fields in order to provide convenience both for the company and for users in order to find information quickly and accurately. Many companies are competing to implement a computerized system that suits the needs of the company with the aim of improving and optimizing the quality of their services. Not even a few companies that include the application of a computerized system in their vision and mission.

One system that is widely used in a company in order to optimize their service quality is the application of a payroll information system, which is expected to help and facilitate the payroll process of employees. The implementation of the payroll information system is very influential on companies or agencies that have a large number of workers. Furthermore, the component of employee wages or salaries is not only the basic salary, but also includes various allowances, incentives, deductions, overtime and other wages outside the basic salary [1]-[5]. The amount of salary for each workforce is also different. If the salary calculation process is still manual, it can be detrimental to the company in terms of time efficiency, which will take a long time, so that it can result in delays in payment or payment of salaries to employees.

Universitas Proklamasi 45 Yogyakarta is a private university whose management is supervised by a Foundation. In every field of work, almost all have used information systems to facilitate their work and managerial governance. But in the employee payroll process, it is not yet effective and efficient because the process is manual or does not utilize an information system, so it still has some shortcomings. These shortcomings include payroll processes that take a long time, the accuracy of data calculation and documentation of data is not well organized. One of the things that makes the payroll process take a long time is to recap data that affects the amount of salary nominal calculated manually, such as employee attendance recap, recap overtime data, and recap of wages other than basic salary. Therefore, it is necessary to have an effective, efficient and effective employee payroll information system to be used in the employee salary calculation process at the Yogyakarta Proclamation University 45 Yogyakarta.

In designing information systems, there are problems that often occur, namely the request for changes in requirements and the addition of features to the system desired by the client when the system design process is carried out [6]-[8]. Therefore, a simple system development method is needed and involves clients in terms of communicating with system developers [9]. Extreme Programming method is one of Agile methodologies that emphasizes good communication with clients, is fast in the development process, and is ready to accept changes and improvements whenever there is an error. Therefore, the Extreme Programming method is used in designing this employee payroll information system.

II. PURPOSE

The formulation of the problem raised from the background above is:

1. Analyzing and designing a web-based Employee Payroll Information System in the Yogyakarta Proclamation University 45

2. Implementing the information system into the employee payroll process in the Universitas Proklamasi 45 Yogyakarta so that it becomes an effective information system

III. RESEARCH METHODS

A. Data Collection Methodology

Data were collected from various sources. Methodology the data collection performed in this study are:

1) Literature Study: Studying the theory / literature and scientific books and references related to Payroll System and Web-based technology applications.
2) Interview: conduct interviews with the project owner regarding the current employee payroll process.
3) Observation: make direct observations when the employee payroll process takes place.

B. Identification of Problems

The main problems that occur in payroll processing are such as the calculation of attendance recap, payroll component data recap, making reports and salary slips that are done manually. This requires a high level of accuracy considering that salary is a right of each employee to receive a valid salary amount, so that it takes a long time in the process of calculating and processing data. The problems contained in this research can be developed with a web-based system, namely the Payroll Information System. This system will help solve the problem because it is computerized and automated so that the data processing and salary calculation can be carried out validly and quickly.

C. Application Development

System development method used in this research is Extreme Programming method. Extreme Programming sequential system consist of:

1) Planning
At this stage defines the scope during the research, analyzes the current system and the problems that occur. Then it continues by analyzing the requirements of the system to be designed.

2) Design
At this stage, designing the system work process and database design in accordance with the results of data collection and the results of the analysis that has been carried out. In designing the work process of this

system, UML is used because it places more emphasis on developing object-oriented systems.

3) Coding

At this stage is the stage where making the system based on the design results that have been made previously. The design is implemented in the form of code that can be understood by computers with programming languages. As previously explained about Extreme Programming that this method involves the client in the system development process, the Coding process is carried out repeatedly if there is a correction from the system user (refactoring).

4) Testing

At this stage, each module that is being developed will first undergo testing. If it is still not in accordance with the request, it will be repaired on the corrected part. If according to the request, the system can be implemented.

IV. SYSTEM DEVELOPMENT USING EXTREME PROGRAMMING

In developing the system using the Extreme Programming method, this resulted in three development phases. An explanation of each of these phases can be seen below.

A. *First Phase*

In this first cycle, it focuses on the main purpose and functionality of the system being developed.

1) First Phase Planning

In this first planning phase, the researcher analyzes the requirements of the developed system. The analysis is carried out by means of interviews and discussions with the project owner. The results obtained are anyone who will use the system later, and how the system works. Users involved in the system can be seen in the Table 1.

TABLE 1. LIST OF USERS WHO USE THE SYSTEM

No	Users
1.	HR Staff
2.	Academic Staff
3.	Financial Staff
4.	The head of the company
5.	Head of Unit
6.	Employee

The next step is to define and analyze the system functional requirements which aim to determine what can be done by the developed system. Functional requirements are:

a. Master data management which includes employee data, position, work unit, work period, and nominal payroll components.

b. Payroll component data management which includes overtime data and meetings.

c. Management of employee attendance data which includes employee attendance data uploads and printing employee attendance recap data.

d. Management of academic data which includes faculty data, study programs, courses, student examinations, exam supervisors, and test results corrector.

e. Management of payroll data that includes generating pay slips, printing pay slips, sending payroll slips, and seeing payroll reports.

f. Providing operational incentives for employees by the division heads of each division.

g. See payroll data that can be done by each employee.

2) First Phase Design

In this first phase design the researcher makes the design process in the form of a use case diagram based on the results of the analysis that has been carried out. The purpose of making a use case diagram is to describe what features or functions the system has developed. Fig. 1 shows the use case diagram of this system.
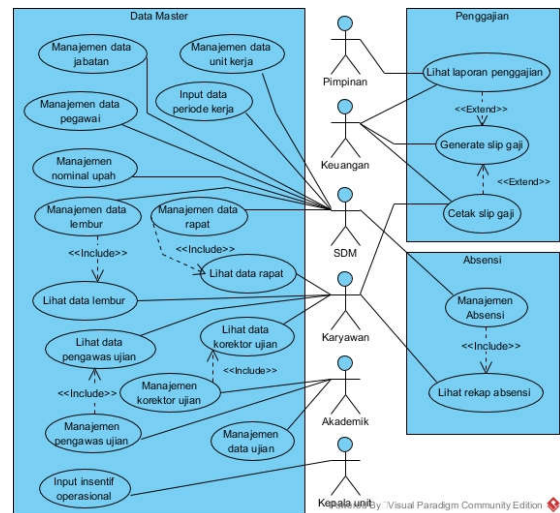

Figure 1. Use case diagram first phase

Next, the researcher makes an activity diagram to describe the activities that occur in the system. There are main activities, namely uploading employee attendance data and generating employee pay slips. Activity diagram can be seen in Figure 2 and Figure 3.

Sequence Diagram design is also needed to explain in detail the sequence of processes carried out in the system to achieve the objectives of the Use Case that have been described previously. The Sequence Diagram can be seen in Figure 4 and Figure 5.
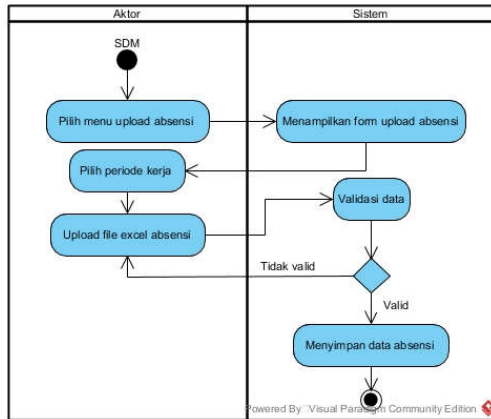

Figure 2. Activity diagram of employee attendant data upload
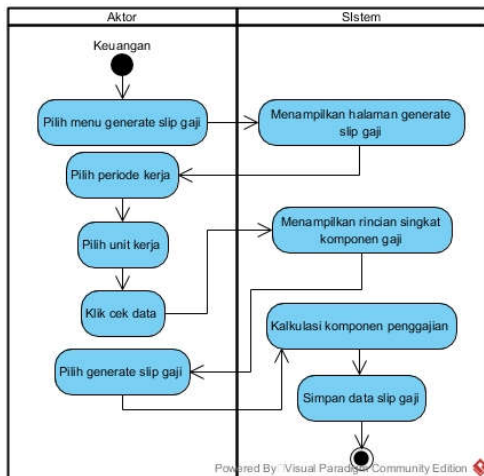

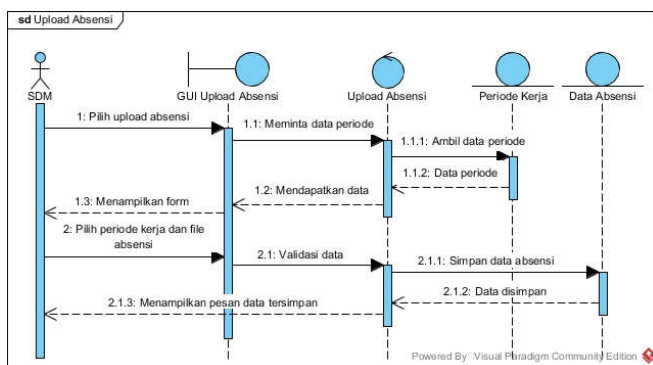Figure 3. Activity diagram of generate payslip

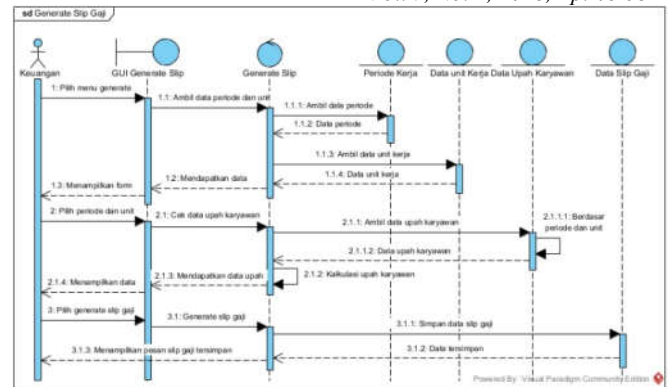Figure 4. Sequence diagram of employee attendant data upload

Figure 5. Sequence diagram of generate payslip

3) First Phase Coding

In this first phase coding, several implementations were carried out which included database implementation and implementation of the interface design that had been created. In the database, there are many tables used. A list of database tables can be seen in the Table 2.

TABLE 2. LIST OF TABLE ON DATABASE IN FIRST PHASE

No.	Table Name	No.	Table Name
1.	Master_bidang	12.	Data_rapat_peserta
2.	Master_unit_kerja	13.	Data_upah_rapat
3.	Master_jabatan	14.	Data_lembur
4.	Master_periode	15.	Data_upah_lembur
5.	Master_jam_kerja	16.	Data_ujian
6.	Master_prodi	17.	Data_ujian_pengawas
7.	Master_matakuliah	18.	Data_ujian_korektor
8.	Master_nominal	19.	Data_upah_pengawas
9.	Data_karyawan	20.	Data_upah_korektor
10.	Absensi_data	21.	Data_insentif_operasional
11.	Data_rapat	22.	Data_slip_gaji

Next, implementation results of the interface design can be seen in Figure 6 and Figure 7.
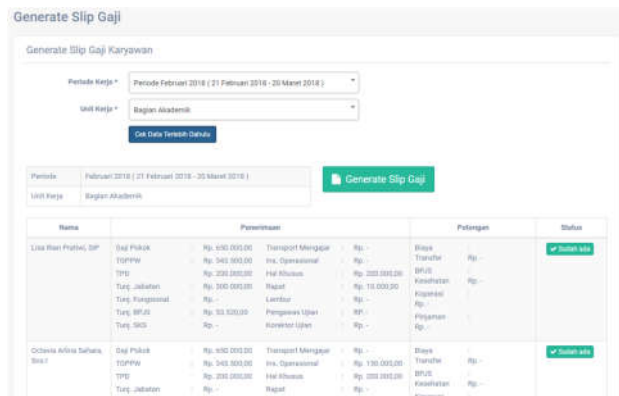

Figure 6. Login page

Figure 7. Generate payslip page

4) First Phase Testing

In this first phase of testing researchers involve all users of the system and focus on the functionality of the system being developed. During the testing process, researchers get requests for the addition of several new features, namely:

   a. Change behavior from each date input field, will be disabled when the work period has not been selected.
   b. Automatic attendance recap when the attendance data upload process is done.
   c. Change employee attendance data.
   d. Employee overtime submission.

In this phase, changes and additions are made to the system database structure, which is adding a table called employee attendance recap and changing employee overtime table. The design of new pages is also done, namely the employee attendance data change page and the overtime request page by employees.

2) Second Phase Coding

After analysis and redesign, researchers carried out the implementation of the system developed. In this second phase, the code structure changes or commonly referred to as refactoring.

3) Second Phase Testing

In the second phase of the testing, it was re-conducted with the project owner. The results of this test are that there are several requests for additional new features in the system, namely:

   a. Additional employee work report management features for employees, which can be used to create daily work plans, daily work reports, monthly checklists, and monthly work reports.

   b. The addition of employee performance appraisal features by the unit head.

e. Speed up the process of generating employee pay slips.

B. *Second Phase*

In this second phase, there are fundamental differences with the previous phase, which is more focused on improving system performance. It can be seen from the results of the first phase testing.

1) Second Phase Planning and Design

The purpose of changing the way of working from the input date field is, so that the date entered is no less or no more than the initial limit and the deadline for the selected work period. So, before the work period is selected, the input date field in the disable state. This is an effective step so that the data entered into the system is more properly documented and neat based on its working period.

Furthermore, the purpose of adding automatic attendance recap functionality is when HR staff upload attendance data, the system will read and store attendance data into the attendance data table, while simultaneously recording the attendance data which will then be stored in the attendance recap table. This will have an impact on system performance when generating employee pay slips, because the process of generating payroll slips requires monthly attendance recap data from each employee. When the process of generating pay slips, the system simply reads the attendance recap data from the attendance recap table, no longer need to do calculations or calculation of daily attendance data from the attendance data table.

C. *Third Phase*

In this third phase, further development is carried out on the system by adding several new features based on the project owner's request. This feature is considered effective by the project owner when applied to the system because it is also included as one of the factors that influence the amount of employee payroll.

1) Third Phase Planning and Design

The reason for the addition of employee work report management features and employee performance appraisal features is as a parameter and also the reference used by the Head of Unit in providing operational incentives to employees who are under him. In addition to the current system, employees make work reports using Microsoft Excel which then sends it to the Head of the Unit via email. The Unit Head must open one by one the work report file sent to him when he wants to see and check what the employee's work report looks like. This will take a long time.

At this stage the researcher again designed the activity diagram and sequence diagram for the management of employee work reports and employee performance appraisal. It also creates a new table in the database, namely the daily work plan and report tables, detailed tables of daily work plans and reports, checklist tables and

monthly reports, detailed checklist and monthly report tables, and employee performance appraisal tables. Then it continues by designing the interface for the employee work report management page which includes pages for daily work plans, pages for daily reports, monthly checklist pages, and pages for monthly reports.

2) Third Phase Coding

Based on the results of the design in the third phase design, the researcher then implements the addition of features to the system developed. The first is to implement work report management features for employee actors by creating pages for daily work plans and reports, as well as pages for checklists and monthly reports.

3) Third Phase Testing

After implementing the feature additions in the previous stage, the researchers tested the system again with the Proclamation University 45 as the project owner. The results of this third phase testing are in accordance with the planning that researchers have done before, and the output produced is in accordance with the project owner's request. Therefore the developed system is ready for release.

V.   RESULT

The previous employee payroll process requires work or salary calculation activities manually. With this payroll information system, the manual calculation can be left behind and switch to using an information system. Payroll data is calculated and presented neatly in the system. Payroll slips which are the final result of the payroll component calculation process can also be obtained by utilizing this payroll information system. Based on the explanation above, the payroll information system that was designed during this study was effective to be used in the employee payroll process because in terms of results it was in line with what was expected.

In terms of time, the payroll information system that was designed also succeeded in increasing efficiency in the employee payroll process at the Universitas Proklamasi 45 Yogyakarta. In the previous system, manual payroll calculation took quite a long time considering the number of data and the number of employees was not small. The calculation must also be careful and accurate so that the results are accurate, so sometimes it is not enough if you only do calculations only once and need to be reset. With this payroll information system, data is calculated and processed by a computerized system so that the level of data accuracy increases and does not take a long time. Based on this explanation, an efficient payroll information system for use in the employee payroll process.

VI.   CONCLUSION

The use of Extreme Programming methods in the development of this system resulted in three phases of development. In each phase there is always a testing phase that involves the project owner to find out whether the system is in accordance with the needs or not. The system development phase is declared complete when all planned system functionality is successfully implemented properly and does not get correction from the project owner.

Based on research that has been done on the development of Web-based Employee Payroll Information System using Extreme Programming method (case study in Universitas Proklamasi 45 Yogyakarta), then the conclusions drawn as follows:

1) This study succeeded in analyzing and designing employee payroll information systems in accordance with the payroll flow in the Universitas Proklamasi 45 Yogyakarta based on the results of the analysis that has been carried out.

2) This research succeeded in implementing the employee payroll information system at the Universitas Proklamasi 45 Yogyakarta so that it became an effective information system.

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