The Development Of Web-based Outcome Based Education Information System

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***Abstract*— The development of Outcome Based Education (OBE) Information System is done as a solution to academic problems related to the achievement of graduate learning for students. In addition, the OBE system is a form of effort to improve academic quality in order to be able to monitor and measure the development of student learning outcomes in a college study program. The Outcome Based Education system includes all grades processing based on Course Learning Outcomes which is related to Graduates Learning Outcomes so that the outcomes of each student can be measured. This information system is developed by the Rapid Application Development method, and uses the Yii2 Framework with the concept of MVC (Model, View, Controller) where system programming is separated based on application components, such as: manipulating data, controllers, and user interfaces. The use of the RAD method and the Yii2 Framework in making applications can be done quickly and in a structured manner making it easier for future developments. The developed system has been successfully tested and applied in the Electrical Engineering Study Program, Civil Engineering Study Program and Mechanical Engineering Study Program, and planned to be implemented in all study programs of the Faculty of Engineering, Sebelas Maret University. This information system can be applied not only in the engineering faculty of Sebelas Maret University but also outside the university which requires an information system to measure the learning outcomes of graduates.**

Keywords*— *Information System, Yii2, Outcome Based Education

I. INTRODUCTION

The information system is a component that connects, collects, processes, stores, and distributes information to support decision making and supervision in an organization [1]. The use of a computerized system is expected to minimize errors made by humans and can streamline the time to complete work quickly and accurately [2]. In addition, a computerized system can function as a data manager to present interactive and communicative information [3].

Meanwhile, there are currently not many output-oriented learning methods and have not even been implemented in Indonesia, but this learning system has been implemented in various countries. Outcome Based Education (OBE) is a learning method that provides a foundation for what students should do. In OBE, learning outcomes or outcomes are identified first then planning learning methods and assessments are adjusted according to the outcome [4]. By adopting an output-oriented learning method and system, it is hoped that it can improve the quality of education, especially in the Electrical Engineering Study Program, Sebelas Maret University and in general in Indonesia.

The Outcome Based Education Information System using the Yii2 framework with the MVC concept (Model, View, Controller) can separate applications based on application components, such as: data manipulation, controllers, and user interfaces [5]. So that model components are easier to implement, test, and maintain, because all access to the model goes through these components. The main purpose of developing using a framework is to help developers work on applications faster. In addition to using the Yii2 Framework, this information system development uses the Rapid Application Development (RAD) method.

The development of the Outcome Based Education Information System is a form of effort to support the needs of the Electrical Engineering Study Program at Sebelas Maret University so that it can monitor the achievements of all students. This system consists of an achievement processing system per subject which contains the value of each Electrical Engineering student.

II. RESEARCH METHOD

A. Software Development Method

The method used in the development of the OBE (Outcome Based Education) Information System is the RAD (Rapid Application Development) method. RAD is a software development model that emphasizes a very short development cycle.

The reason for using the RAD method is because the application designed and developed is a simple application and does not require a long time. This is in accordance with the objectives of the RAD model, namely to shorten the time between designing and implementing information systems[6].

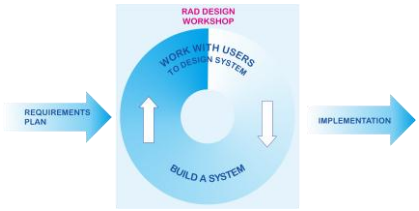


Fig 1. Information system development step

1) Requirement Plan
   a. Data and information requirements plan
   b. System user analysis
2) Workshop Design
   a. Entity relationship diagram(ERD) design
   b. Database design
3) Implementation
   a. Implementation and testing of information systems

B. Testing Method

In this study, the authors used black box testing techniques. Black box testing techniques are tests that are based on application details such as displays, functions on the system, and the suitability of the flow of functions with user needs. The purpose of this black box test is to find errors in function and output that are incompatible with the application program [7].

TABLE I. BLACK BOX TEST FORM

No	Function	Testing
1	Login Process	Enter the account in the form of a username and password and inject the URL.
2	System Permissions	Inject URLs that are owned by other access rights and check the appearance and functions of the tasks that each permissions has.
3	CRUD Process	Perform the process of create, read, update, delete from and to the database through the system being created.
4	KRS Import Process	Import KRS through excel files and check data in the database.
5	Grade Import Process	Import values through excel files and check data in the database.
6	CPL Evaluation Monitoring	Check monitoring calculations and display them in the form of radar charts and histogram graphs.

III. RESULT AND ANALYSIS

A. Design and Implementation of Internship and Final Project Management System

Implementation is done by writing program code (coding) according to the design that has been done. In the implementation section, a screenshot of the website page is displayed as a tool and material for research.

B. Software Testing using Black Box Method

1) Login Process

login is done to find out whether the user can enter the dashboard page using the account they have.

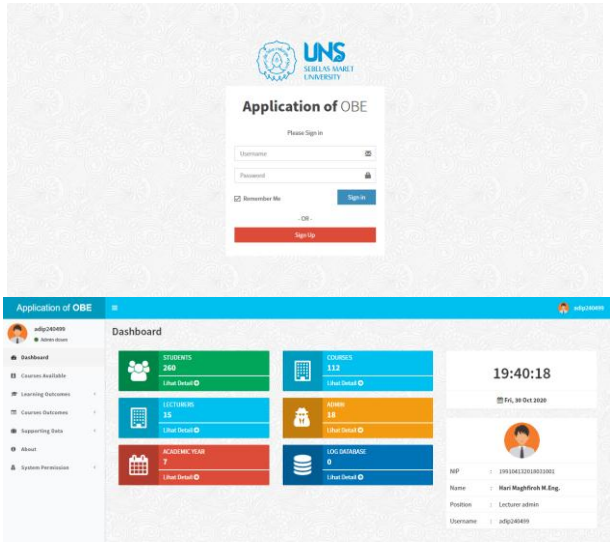
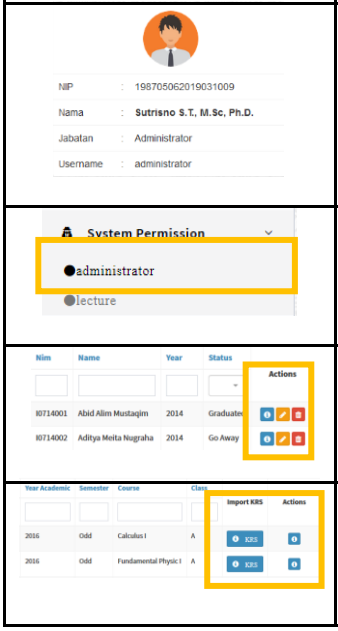
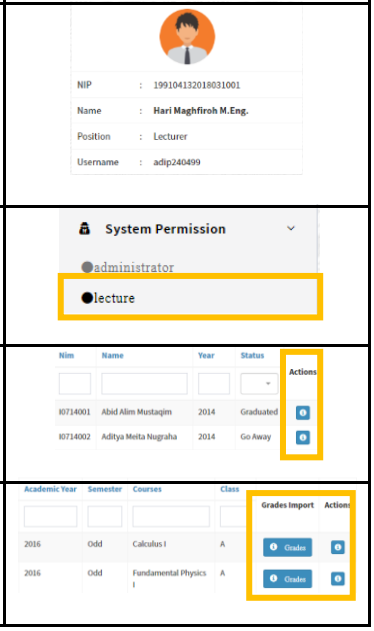


Fig 1. Login

2) System Permissions

Testing the system permissions function is carried out to find out whether the permissions are functioning according to their respective duties.

TABLE II. SYSTEM PERMISSIONS

Administrator	Dosen
	

3) CRUD Process

CRUD function testing is done to find out whether the system can perform tasks create, read, update, delete from and to the database.

a. Create

Fig 2. Create Process

b. Read

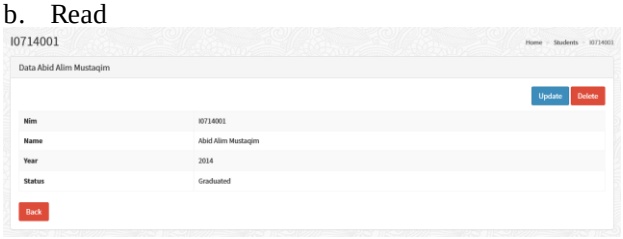


Fig 3. Read Process

c. Update

Fig 4. Update Process

d. Delete

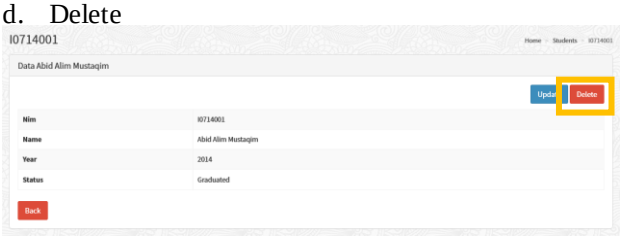


Fig 5. Delete Process

4) Import KRS File Process

a. KRS template file

Templates are downloaded from the system in the .xlsx extension. Each template has a unique code to differentiate files from one another.

	A	B	C
1			
2		SEBELAS MARET UNIVERSITY	
3			
4		Faculty	FACULTY OF ENGINEERING
5		Study program	S1 - ELECTRICAL ENGINEERING
6		Academic year	2016
7		Semester	Odd
8		Course Code	EE0101-19
9		Course Name	Calculus I
10		Class	A
11		Lecturer	Dr.Ir. Augustinus Sujono M.T.
12		gtYKXjf4z6fctHd/vrKLoQ==	
13	No	Nim	Student Name
14			
15	1	I0716006	Annisa Hanifa
16	2	I0716012	Daniel Aquino Purba
17	3	I0716026	Musyaffa' Ahmad

Fig 6. KRS template file

b. Import Process

The system reads the unique code on the imported excel template, if the code is correct then the file will be processed by the system. Each student data is checked whether the NIM entered is in ref_mahasiswa or not, this feature serves to reduce data entry errors. If the NIM is in the database, the student is entered into the broadcast course. The correct data will be entered into the database, then the student's NIM and broadcast courses are stored in the database in the form of ID. Data with errors are not entered into the database and will be given feedback to the user as "errors".

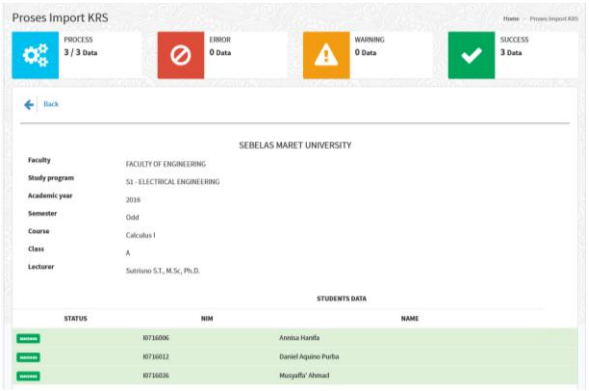


Fig 7. KRS Import Process

5) Grade File Import Process

a. Grade template file

Templates are downloaded from the system in the form of an .xlsx extension. Each template has a unique code to distinguish files from one another and contains data of students who take the broadcast course. The lecturer enters the value according to the CPMK amount listed on the template.

	A	B	C	D	E	F	G	H
1								
2			SEBELAS MARET UNIVERSITY					
3								
4			Faculty	FACULTY OF ENGINEERING				
5			Study program	S1 - ELECTRICAL ENGINEERING				
6			Academic year	2016				
7			Semester	Odd				
8			Course Code	EE0101-19				
9			Course Name	Calculus I				
10			Class	A				
11			Lecturer	Dr.Ir. Augustinus Sujono M.T.				
12			gtYKXjf4z6fctHd/vrKLoQ==					
13	No	Nim	Mahasiswa	Nilai				
14				CPMK1	CPMK2	CPMK3	CPMK4	
15	1	I0716006	Annisa Hanifa	78	67	81	76	
16	2	I0716012	Daniel Aquino Purba	88	82	76	77	
17	3	I0716026	Musyaffa' Ahmad	80	81	77	75	

Fig 8. Grade template file

b. Import Process

The system reads the unique code on the imported excel template, if the code is correct then the file will be processed by the system. Each student data is checked whether the student entered takes the broadcast course or not, this feature serves to reduce data entry errors. If a student takes a broadcast course, the student's score will be checked whether the value entered matches the number of CPMK in the course. The correct data will be entered into the database, then the student's NIM and CPMK will be stored in the database in the form of ID. Data with errors are not entered into the database and will be given feedback to the user as "errors".

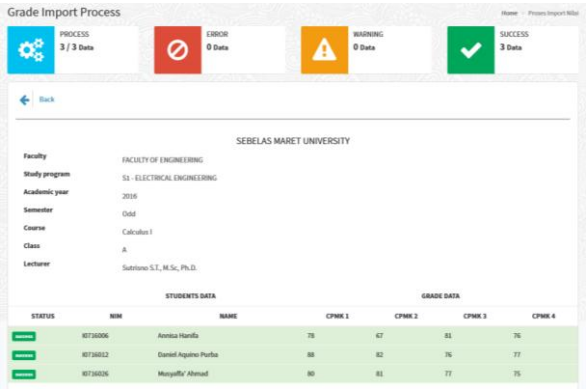


Fig 9. Grade Import Process

6) Monitoring Evaluation

CPL evaluation monitoring is broadly divided into two parts, namely monitoring the CPL evaluation for active students and monitoring the CPL evaluation for students with alumni status. In each monitoring evaluation consists of individual evaluation monitoring, monitoring evaluation per semester and monitoring evaluation per batch. In the implementation of CPL evaluation monitoring in this chapter, only CPL evaluation monitoring screenshots are displayed for active students because the monitoring display for alumni is not much different from the monitoring display for active students.

a. Transcript

	A	B	C	D	E	F	G	H
1	SEBELAS MARET UNIVERSITY							
2	TRANSCRIPT							
3								
4	NAME		Daniel Aquino Purba					
5	NIM		I0716012					
6	YEAR		2016					
7								
8								
9	NO	KODE	COURSE	GRADE				
10				CPMK 1	CPMK 2	CPMK 3	CPMK 4	CPMK 5
11	1	TKS21103	Calculus I	78	67	81	76	
12	2	TKS24085	Fundamental Phy	90	90	90		

Fig 10. Transcript

b. Radar chart

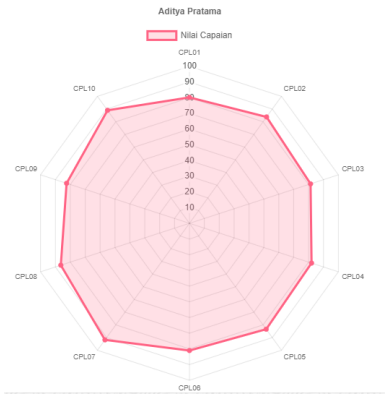


Fig 11. Radar Chart

c. Grafik histogram

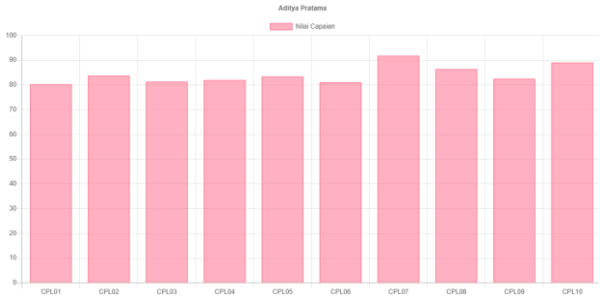


Fig 12. Histogram Chart

IV. Conclusion

The Outcome Based Education (OBE) information system was developed using the Yii2 web-based framework with the RAD (Rapid Application Development) method which includes the needs planning, workshop design and implementation stages. This OBE information system can display graduate learning outcomes in monitoring evaluation individually, per semester, per batch and monitoring evaluation for students who have graduated. The learning outcomes generated by this system can be one of the considerations for study programs to make policies related to student learning.

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