

Design of Reporting, Evaluation, and Monitoring Application for Student Organization in University

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Abstract— In few decades, the development of information system has been increased rapidly. It is because most organization in various sector of industries, commerce, government, or even education become highly dependent on the use of information system. The purpose of this study is to design the application that will facilitate the reporting, evaluation, and monitoring activities of student organization based on what user needs. The object of this study is student affair department in one of faculty in one of universities in Indonesia. The method employed in this study to design the system is waterfall. The system designed in this study is focus on the activities related to student organization activities. The result of this study found that there are eight dimensions of web quality that has to be fulfilled by the system according to the result of focus group discussion and Delphi method. The system designed in this study was adjusted to the needs that have been defined previously.

Keywords—Information system design, student organization, waterfall method

I. INTRODUCTION

Nowadays, most organization in various sector of industries, commerce, government, or even education become highly dependent on the use of information system [1]. Information system (IS) is defined a set of interrelated components that collect, process, store and distribute information to facilitate activities in organization including coordination, monitoring, control, and decision making [2]. In few decades, the development of information system has been increased rapidly [3]. The main reason of one organization implemented IS is due to its ability to collect, process, distribute, and share data in integrated and timely manner [4]. The use of information system is become required in the organization to facilitate more effective and efficient activities [5].

Educational sector is one of sector that implement the use of IS to streamline their activities, even for the simplest activities are required the use of IS. One of the activities that is need for information system is the activities of reporting, monitoring, and controlling of student organization activities in one of university in Bandung, Indonesia, currently the reporting process, monitoring and evaluation has been carried out by the

faculty manually and takes a long time for generate the report of the activities that had been done. Student organization is an organization that consist of students that is legalized by the universities. Reporting, monitoring and discussion activities are needed as a form of management carried out by faculties, besides that these activities are also useful for determining programs to be developed from faculties for non-academic related activities.

This is the basis for which can shorten the time for making student work program related reports conducted by the faculty. The reporting process and also the evaluation and monitoring process was carried out by the student department still uses hardcopy reporting and no good archiving, this causes activities carried out by student staff to report because of these reports. This condition causes the process of data and documents to become more difficult and require a long time.

Based on this, a system that can help the student division in the work unit to be able to carry out archival activities in the framework of non-academic activities conducted by the association or students is required. In addition, the digitization of documents and automatic creation becomes monitoring and the process can be done quickly. The form of reporting in the system will be used for the process of non-academic activities carried out by students, because the data input process is faster. Making reports can be faster and accessible by using the internet. Therefore, this study aimed to design the application that can facilitate monitoring, evaluating and controlling student organization activities where the application will be designed based on user requirement.

II. METHOD

This study adopted the waterfall development model to develop the application. The main reason of using the method is because the method is commonly used in building software. Moreover, this model employed a sequential approach from the phase of system requirements to maintenance [6]. Waterfall method requires a clear planning at the beginning of

development. Although in according to the theory this method does not allow for iterations at the development stage, in reality it does not rule out the possibility of an iteration at each stage but the documentation of each stage is just one document. The phase of waterfall model can be seen in Fig. 1. According to Fig. 1, there are 5 phase of waterfall model i.e. requirement definition stage, system and software design, implementation and unit testing, and operation and maintenance. At the requirement stage, the process of identifying problems obtained from literature studies and field studies. Field studies are based on business processes carried out in reporting student activities in the university. In the identification phase, the quality dimension for information systems was developed by Soesanto, Kurniawati, and Iqbal [7] was used to determine the application requirements in detail based on user's needs and the purpose of application design.

In the development phase, the waterfall model was employed. Each phase in waterfall model was run sequentially where looping scheme was allowed in this study. In the first phase of the waterfall method, the requirement analysis was conducted to identify the business process of proposal submission until the activity evaluation of student activities. Other than that, the identification of data needs also performed to determine the system requirements.

In the second phase of the waterfall method, the system was designed by designing the initial display design, application feature design, and system database design. In the implementation phase the coding of the system was done for the initial display and template, followed by coding features and dashboards, coding for the upload feature file for student activities. In the testing phase, testing of the system was done for the initial display of the application and testing the functionality of the application features. Testing activity was performed to find out whether the application is running with a bug or not. The test is carried out using the black box testing method so that it produces documentation testing. After the functionality has been tested, the next step is to do usability testing. Testing is carried out to the stakeholders.

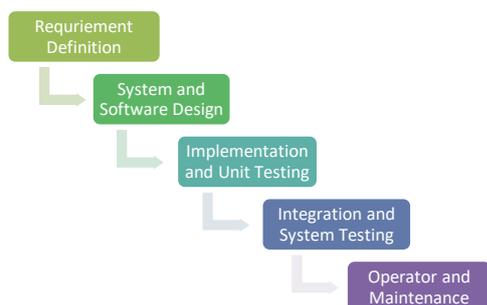


Fig. 1 System Development Model

III. RESULT AND DISCUSSION

A. Requirement definition

At requirement definition stage, the requirements of the system were identified in detail. Moreover, in this phase, a quality dimension for information systems developed by Soesanto, Kurniawati, and Iqbal [7] was adopted to determine application requirements in detail in terms of user needs and the purpose of application design. The Voice of Customer (VOC) is developed in this phase. Quality dimensions used in this study consists of reliability, efficiency, support, security and privacy, ease of use, appearance, content, effectiveness, acceptability, customizable, and maintainability. Table 1 shows VOC from each Quality Dimension.

TABLE 1
VOICE OF CUSTOMER FOR EACH QUALITY DIMENSION

No	Quality Dimension	Voice of Customer
1	Reliability	<ul style="list-style-type: none"> Reliability of service performance Fault tolerance Real time information Trusted information
2	Efficiency	<ul style="list-style-type: none"> One data entry for all purposes
3	Support	<ul style="list-style-type: none"> The availability of web site usage information The availability of troubleshooting service
4	Security	<ul style="list-style-type: none"> Ability to safeguard
5	Ease Of Use	<ul style="list-style-type: none"> Information system is accessible everywhere The information system can be accessed from other platform Provide notification of newest information Available in many languages
6	Appearance	<ul style="list-style-type: none"> The information system is unsightly Easy to read the text
7	Content	<ul style="list-style-type: none"> Allow users to easily access the content Easy to understand information provided by the system
8	Effectiveness	<ul style="list-style-type: none"> Accommodates organizational process business Cover the business objective
9	Acceptability	<ul style="list-style-type: none"> Meet the objective Suitable for organization
10	Customizability	<ul style="list-style-type: none"> User can edit their personal data User can search the data that has been entered Information system can adapt to the policy change
11	Maintainability	<ul style="list-style-type: none"> The information system is stable easy to maintain

After the voice of customer was determined, the focus group discussion (FGD) was conducted with stakeholders as the participant to determine priorities and needs of the system to be designed. The participants of FGD were Vice Dean of Academic

Affairs, Chair of the Industrial Engineering Program, Chair of the Information Systems S1 Program, and Head of Student Affairs in the Industrial Engineering Faculty. Broadly speaking, according to the FGD, the designed system must be able to accommodate 4 pillars of student affairs, namely competitions, scholarships, soft skill development, and development of student organization. The results of the FGD can be seen in Table 2.

TABLE 2
RESULT OF FGD

Quality Dimension	Voice of Customer	Code
Reliability	• Real time information	RE1
	• Trusted information	RE2
Efficiency	• One data entry for all purposes	EF1
Support	• The availability of manual guide	SU1
	• The availability of troubleshooting service	SU2
Security	• Ability to safeguard	SE1
Ease Of Use	• Information system is accessible everywhere	EU1
	• The information system can be accessed from other platform	EU2
	• Provide notification of newest information	EU3
	• Available in many languages	EU4
	• Text is easy to be read	EU5
Content	• Allow users to easily access the content	CO1
	• Easy to understand information provided by the system	CO2
	• Notification of proposal submission	CO3
	• The existence of budget planning module	CO4
	• The existence of reporting module	CO5
Customizability	• User can edit their personal data	CU1
	• Information system can adapt to the policy change	
Maintainability	• The information system is stable	M1
	• easy to maintain	M2

From the results of the FGD, there were several dimensions that are excluded. It is because those dimensions have been included in other dimensions for student activities, so they are not needed. On the other hand, there are several VOCs added to the content dimension because the system is specifically designed for monitoring and evaluating student activities. The FGD results are then distributed back to the respondents to find out which dimensions should be prioritized to be designed into an information system. The Delphi method with the consensus of 60% was used to determine which dimension should be prioritized to be chosen to be included in the system. Table 3 shows the results of Delphi method. From the results of the Delphi questionnaire it was known that all quality dimensions should be included in system design.

Moreover, the specifications needed in system design are divided into two categories, namely technical specifications and content requirement specification. For technical specifications, so that the VOC for EU1, SE1, M1 can be achieved, good infrastructure is needed. The availability of adequate networks and hardware is needed so that the VOC can be achieved. Web-based applications and the use of hosting services can be a solution. Multiplatform is one of requirement that must be fulfilled so that the designed application can be accessed from different devices. From content specifications, the application designed must be in accordance with the VOC from the Content, including information systems allowing users to access content easily, information provided is easy to understand, Status Notification of Proposal Submission, a Budget Planning Module, Monitoring Module, and Reporting Module. Moreover, the designed application must be able to display all the information in real time. From maintainability specifications, the information system must be stable and easily to be maintained. Moreover, the information system must be stored in a good hardware infrastructure. The information system that is designed will be web-based application. Therefore the system is better stored in hosting that is already owned by the faculty so it will be easier to be maintained and become more stable. For security specifications, the use of access rights and authentication with logins is the way that is done in the system integration so that the system is gated. Information system needs for this research are shown in Table 4.

TABLE 4
INFORMATION SYSTEM REQUIREMENT

Platform	• Web-based
Host	• Faculty Server
Security	• Authorization user only
	• Authentication login
User	• Head of Faculty student affair
	• Vice Dean II
	• Head of Human Resource and Finance
	• Student Organization
	• Budget Planning module
Content	• Monitoring module
	• Reporting Module

B. System and Software Design

At this stage, the initial design, application feature design, and system database design were developed based on the results of the previous stages. The database needed is a database for users, proposals, evaluations, and monitoring. Figure 2 shows the database design for the system. Moreover, the dashboard display that is tailored to the needs of stakeholders can be seen in Figure 3. To fill the data in the dashboard, a page is needed to enter the proposal

data. Figure 4 shows the design of the proposal display. When the proposal has been submitted by the student organization, the proposal must be approved so that the funds can be disbursed from the finance department, for this reason a page is needed to evaluate the proposal. Figure 4 shows the evaluation display design.

C. Testing

At this stage, testing is done for the initial display of the application and testing the functionality of the application features. Testing is done by all the stakeholder that is involved in the process, the purpose is to find out if the application is running without a bug. For initial testing, there are 2 different users tested the application. The test is carried out using the black box testing method so that it produces documentation testing. the Table 5 shows the results of the functionality test.

Fig. 4 Design of Proposal Submission Page

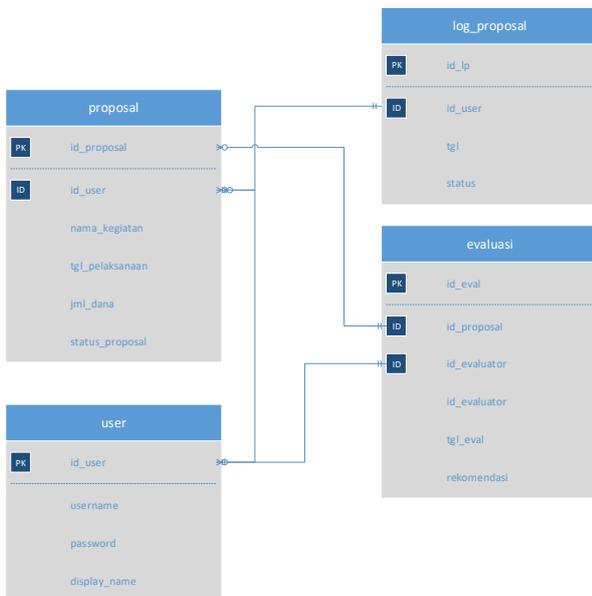


Fig. 2 Entity Relationship Diagram of the Application

Fig. 5 Design of Evaluation Page

D. Implementation

At this stage coding is done for the initial display and template, followed by coding features and dashboards, coding for the upload file for student activity report files. Figure 6 shows the display of the dashboard at the level of access rights Head of Student Affair in Faculty.

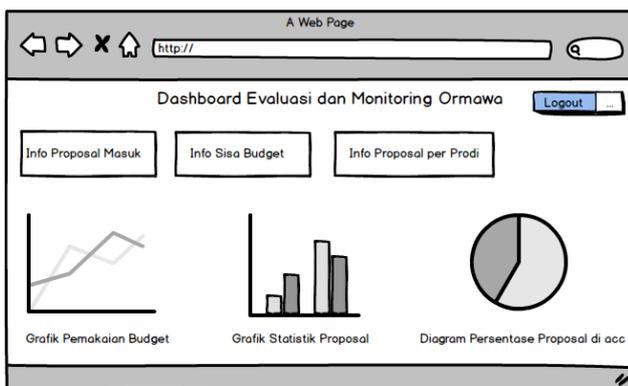


Fig. 3 Dashboard Design



Fig. 6 Dashboard interface

TABLE 5

RESULT OF TESTING		
Scenario	Expected Result	Status
User login using given username and password	Go to dashboard page	Valid
User head of student affair see the dashboard page	Dashboard appear in web page and the data in the dashboard also appear	Valid
User Student upload/ submit proposal	Proposal stored in the database	Valid
User head of student affair evaluate student proposal	Evaluation data stored in database	Valid

From the results of the functional test, it can be seen that the system designed is in accordance with what is expected. All program outputs are in accordance with what was designed. The next test is by testing the system usage to stakeholders. From the results of the test, it is known that the Head of Student Affairs Office has approved the entire function of the system that is designed.

IV. CONCLUSION

According to the user requirement identification, it was identified that there are eight quality dimensions that has to be fulfilled by the system according to the result of focus group discussion and Delphi method. The system designed in this study was adjusted to the needs that have been defined previously. Moreover, this application will be focus on proposal submission activity, evaluation activity, and monitoring activity so that all the stakeholder related to student affair activity can review, evaluate, and monitor all student activities reported in the system.

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REFERENCES

- [1] Joe Peppard and John Ward, "Beyond strategic information systems: towards an IS capability," *Journal of Strategic Information Systems*, vol. 13, pp. 167-194, 2004.
- [2] Kenneth C. Laudon and Jane P. Laudon, *Management Information System: Managing Digital Firm*, Fourteen Edition ed.: Pearson, 2016.
- [3] Heri Pratowo Widodo, Kertahadi, and Imam Suryadi, "The Influence of Job Relevant Information, Task Technology Fit, and Ease of Use Information Technology Due to the User Performance: A Case Study on the End Use of Academic and Financial Information System in University of Brawijaya," *Asian Journal of Social Sciences & Humanities*, vol. 4, no. 2, pp. 128-138, 2015.
- [4] Demian Abrego Almazán and Yesenia Sánchez Tovar, "Influence of information systems on organizational results," *Contaduría y Administración*, vol. 62, pp. 321-338, 2017.
- [5] Afrin Fauzya Rizana, Amelia Kurniawati, Rayinda Pramuditya Soesanto, and Fadillah Ramadhan, "The Role of Individual Characteristic in Encouraging User Performance and Continuance Usage Decision of Enterprise System," in *International Conference on Instrumentation, Management, Automation, Control Systems, and Informatics (IMACSI 2018)*, 2018.
- [6] Ian Sommerville, *Software Engineering*. Essex: Pearson, 2009.
- [7] Rayinda Pramuditya Soesanto, Amelia Kurniawati, and Muhammad Iqbal, "MEASURING LABORATORY ADMINISTRATION SYSTEM SATISFACTION : A CASE STUDY," in *9th International Seminar on Industrial Engineering and Management*, Padang, 2016.