Development and implementation of web based infrastructure for problem management at UNPRI

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Abstract. Information technology drastically affects human way of thinking. It has entered every part of human life and also became one of the most significant contributors to make human life more manageable. Reporting a problem of facilities and infrastructure in Universitas Prima Indonesia was done manually where the complainant have to meet the responsible person directly and describe how the problem looks like. Then, the responsible person only solve the problem but have no good documentation on it like Five Ws and How. Moreover, the other issue is to avoid a person who is mischievous for giving false reports. In this paper, we applied a set of procedures called Universitas Prima Indonesia Problem Management System (UNPRI-PMS) which also integrated with academic information system. Implementation of UNPRI-PMS affects all of the problems about facilities and infrastructure at Universitas Prima Indonesia can be solved more efficient, structured, and accurate.

1. Introduction

Universitas Prima Indonesia is one of the private universities in Medan, North Sumatera with complete infrastructures and also located in four different places [1]. Reporting and handling an infrastructure problem manually using maintenance form has its own limitation. The poor service delivery due to paper-based is the main problem as required an extensive time to review the collected data [2]. It could because of mistaken problem handling, problem recorded unsystematically, and difficult to recognize an information in form because the data is written by human [3]. Management of an operational in people, materials, infrastructure and technology is named goods and services [4]. In order to make maintenance management effectively, there needs to be an integrated maintenance management process from the reporting stage to the maintenance execution for infrastructure [2]. The maintenance management processes started from complaints by staffs that brought them to the office counter to report defects. Then the reports are received by maintenance management Unit for identification and are recorded in database for immediate action and reference. Lastly, the field coordinator instructs electrical technician and mechanical technician for the maintenance execution of facility [5].

In this research, we applied a set of procedures called Universitas Prima Indonesia Problem Management System (UNPRI-PMS) which also integrated with academic information system. With the integration, students or staffs are able to report any issues about facilities and infrastructure. All of the progression will be documented well and also prevented from false reports. Implementation of
UNPRI-PMS affects all of the problems about facilities and infrastructure at Universitas Prima Indonesia can be solved more efficient, structures, and accurate.

2. Method

2.1 State Transition Diagram
Unified Modelling Language (UML) is a diagram that describe an object class with transition from one state to another state and visualize the design of a system (Hendri, 2007:90). State Transition Diagram is created for dynamic objects, so in each class could have more than one state diagram[6,7]. The transition from one state to another one can be discovered by the construct of the ‘machine’ and this merely effectuation that the system can be in a finite quantity of assorted states. Whatever the system and where we get a various output, it depends on what has happened ahead, this is a finite state system. The exemplary can be as elaborate or as abstract as it need to be is one of the asset of the state transition proficiency. Where a portion of the system is more than all important a greater depth of appendage can be modeled [13].

2.2 Web Based Applications
Web-based applications have high reliability, usability, more secured, takes a shorter time to market and shorter product life cycles, and also require continuous maintenance [8,11]. Many frameworks for web application development have been introduced and require a lot of resources, includes developers and tools [9,11]. In small software companies, they involved 10 to 50 employees generally for working on a project [10,11].

2.3 Integrated Information System Based on Web Services
Web Service technologies is considered to be the best solution of the problem of software complexity and reusability. Generally, web services are modular applications or functions, which are independent and self-describing, that can be discovered and called across the Internet or an enterprise intranet. Web services are based on open standards such as WSDL (Web Services Definition Language) for description, SOAP (Simple Object Access Protocol) for communication and UDDI (Universal Description, Discovery, and Integration) for register and discover services. Service choreography and orchestration is the next stage in developing and extending web services paradigm and addresses the need of composing several services in some business logic in order to achieve more complex and meaningful processes. The most common technologies for services composition appear to be BPEL and XPDL[12].

2.4 Workflow
To achieve a goal, workflow is needed to automate sets of procedure which had been initiate to completion [15,16]. Workflow Management Coalition (WFMC) stated that automation is a business process neither whole nor partial of documents, information, or task which is flow from one to another based on the initial behaviour. There are some benefits that can be gained from implementation of workflow management:
1. Reduced operating cost
2. Improved productivity
3. Faster processing times
By using the concept of the workflow management system, all of the initial procedures can be translated into a workflow form[14].
3. **Design**

For a submission of problem, firstly, a staff have to write a description and save it as draft. Secondly, the staff update the status of a problem from draft to a new submission. In order to update the status, the staff have to tell the system that who the submission will be known (in this case, the problem have to be known by dean). Once the problem confirmed and validated by the dean, the status have to update from new submission to new request. If the problem is declined, it will be returned to the staff who submit that problem, so the status will be back to draft. Nevertheless, the problem will be shown in field coordinator page and to be responsible to follow up the problem. The field coordinator have to update the status from new submission to in progression. In any update of the problem, the field coordinator have to tell the staff who submit that problem by the system. Once the problem solved, the staff have to update the status from in progression to closing request. Lastly, the dean will recheck the progression of the problem and also update the status from closing request to closed once the solution confirmed. If the solution declined, the problem will be return to the field coordinator to resolved.
Figure 2. Login session.

Figure 3. Request for filling the application description. status: draft.
Figure 4. New submission to the dean. status: new submissions.

Figure 5. The dean processes into a new request. status: new request.
**Figure 6.** The field coordinator takes the new request status: process.

**Figure 7.** The Field Coordinator processes the application and records the completion description. status: process.
Figure 8. The admin confirm the completion and closure request to the dean. status: closure request.

Figure 9. The Dean close the submission. status: close.

4. Result and Discussion
UNPRI-PMS application is designed to fulfill the infrastructure’s services in Universitas Prima Indonesia. The application is an online system, so it is easy to access neither anytime nor anywhere with only internet access. Staff can log in to the system with a link http://unprimdn.ac.id/administrator/login by a browser. Implementation of UNPRI-PMS in Universitas Prima Indonesia is a proof that technology able to improve quality of services. In conclusion, with the implementation of UNPRI-PMS affects all of the problems about facilities and infrastructure at Universitas Prima Indonesia can be solved more efficient, structured, and accurate.
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