Incident and Service Request Management for Academic Information System based on COBIT

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***Abstract*— This paper explores application of Incident and Service Request Management for academic services. We are using Control Objectives for Information and Related Technologies (COBIT) framework as basis for determining the activities in Incident and Service Request Management. The COBIT itself is an IT governance framework included incident handling and service requests, also providing incident response and service request decisions. The software will be developed as a proof of concept that it brings benefits to academic service operations. For most academic services in university, encountered a problem such as incidents reports or a request for services are not immediately addressed, took a long time to respond, or even lost and left unreadable. It is a good idea to standardize incident management and plant it into academic information systems to enforce its application. In software development, we perform five development stages: requirement analysis, system design, stakeholder confirmation, system development, and system evaluation. In requirement analysis stages, we elicited features from activity describe in COBIT and customize it based on interviews and observation. We design use case diagram, use case scenario and database design in system design stages. In stakeholder confirmation stages, a meeting with the stakeholders held and discuss whether the system complies with the requirements or not. system adaptations are made to answer stakeholders concern. System development is conducted based on confirmed system design. Stakeholder evaluated after they follow the case simulation session. Stakeholders provide an evaluation of the system according to their role, based on their experience when using the system in the simulation session. User experience (UX) aspects are also evaluated based on user's interaction with the system. User experience results obtained meet all aspects, including useful, usable, desirable, findable, accessible, credible, and valuable. The evaluation with stakeholder demonstrates the improvement of academic service quality and user satisfaction of the proposed Incident and Service Request Management system solution.**

Keywords*— *Academic Information System, COBIT, Incident management, Incident reporting system, Service request, Software development

I. INTRODUCTION

The handling of incidents that occur in organizations is usually carried out based on the experience of existing staff. Differences in staff experience, lack of proper management makes incident handling fail to achieve the expected quality of completion [1]. The issue of time in handling incidents and service requests is an important concern for organizational management [2] [3], it is expected that incident handling and service requests can be made as short as possible.

These management issues of incident and service requests occur in many business domains, including Higher Education. The application of academic information system nowadays has become mandatory and inevitable for universities [4] [5] [6]. But most academic information systems are still focused on the main processes of universities. Incident and Service Request Management has not been a major concern of academic information systems.

Incidents in academic information systems may be incidents related to IT systems (e.g. error when input value to academic information system) or within academic scope (e.g. collision lecture schedules, damaged classroom facilities). Service requests are limited to requests for services that are often handled by academics, such as classroom usage requests.

This paper proposes to adopt best practice from incident management framework to academic information system. There are several frameworks that deal with incident management, such as COBIT (Control Objectives for Information and Related Technologies) [7] and ITIL (Information Technology Infrastructure Library) [8]. In this study, we will focus on using the COBIT framework as the basis for determining the activities that need to be done. The implementation of the framework has been proven to improve the maturity of organizational governance [7][8][9] [10].

The purpose of this research is to establish incident management and service request mechanisms for academic services. The software development will be done as a proof of concept [11][12]. Requirement Elicitation, Software Design, Stakeholder validation, software development, and software testing will be done in this study to develop Incident and Service Request Management software.

II. METHODS

The focus of this research is to design the incident and service request management system for academic services based on the COBIT 5 framework. Case studies were conducted at the Faculty of Science and Technology

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Airlangga University (FST UNAIR).

A. Requirement Elicitation

The system requirements are identified through interviews and observation. Interviews were conducted to identify the parties involved in the incident handling, service request, problems, and constraints. Observations are made to observe directly any incident handling and service requests activities, as well as the assignment of responsibilities.

Process adjustments in academic services are designed considering COBIT. System requirements of the academic service information system were made based on the activities in Manage Service Requests and Incidents Audit/Assurance Program in COBIT framework [7]. Incidents management and service request process has several activities, namely:

1) Define incident and service request classification schemes
2) Record, classify and prioritize requests and incidents
3) Verify, approve and fulfill service requests
4) Investigate, diagnose and allocate incidents
5) Resolve and recover from incident
6) Close service requests and incidents

B. System Design

The system built on a web platform. In system design include use case diagram, use case scenario, and database design.

1) Use Case Diagram: This diagram illustrates the system user actors involved in the incident management and service request process as a functional model of the system.

2) Use Case Scenario: Use Case Scenario is based on steps in the incident management and service requests process in the Faculty of Science and Technology. This scenario contains the activities that are performed by each actor into the system.

3) Database Design: The design of the database done by using two models: Conceptual Data Model (CDM) and Physical Data Model (PDM).

C. Confirmation of System Design to Stakeholder

At this stage a discussion with the head of academic administration at FST UNAIR conducted. System design and mockup presented to get feedback from stakeholder [14]. System is designed based on information obtained from interviews, observations, and best practices from COBIT.

D. System Development

A web-based system will be developed to implement the design. Implementation is made based on the system design. Functional testings are performed according to system design specifications. Some of the possible cases of incident and service requests are tested in the system. It is used to assess whether the system is acceptable to use.

E. Evaluation

Simulation session is put into practice to evaluate incident and service request management. In addition, evaluation is done to see the user experience aspects such as usable, useful, desirable, accessible, credible, findable, and valuable [15][16] [17].

III. RESULTS AND DISCUSSION

A. Results of Requirement Identification

Interviews were conducted with the head of academic administration in FST UNAIR to identify the parties involved in the flow of incident and service requests.

Observations are made to observe directly every activity of incident handling and service request. Observations were made at the FST UNAIR.

Students, lecturers, and employees can report incidents or requests a service. Such complaints may be non-normal events or also a request to a service. Academic officer will process the report. If the academic officer does not handle the case then the escalation is executed, structurally to the vice deans or functionally to the IT department.

We mapped the roles directly related to the incident management and service request process on FST UNAIR using RACI (Responsible, Accountable, Consulted, and Informed) Chart/ A responsibility assignment matrix [7] [8]. These roles are needed to determine the responsibility for implementing incident management and service requests.

TABLE I. RACI CHART

No	Activity	academic officer	IT department	Vice Dean
1	Prioritize incidents and Service Requests	R	I	I
2	Handling requests and incidents	R	-	C
3	Identify incidents	R	I	I
4	Investigation and Diagnosis	I	C	I
5	Resolve and recover from incident	R	I	I
6	Close service requests and incidents	R	C	I

R = Responsible, A = Accountable, C = Consulted, I = Informed:

To aligning the current system with COBIT, COBIT key management practices are use as an ideal activity baseline. System functional requirements are translate from COBIT 5 activities (Table II).

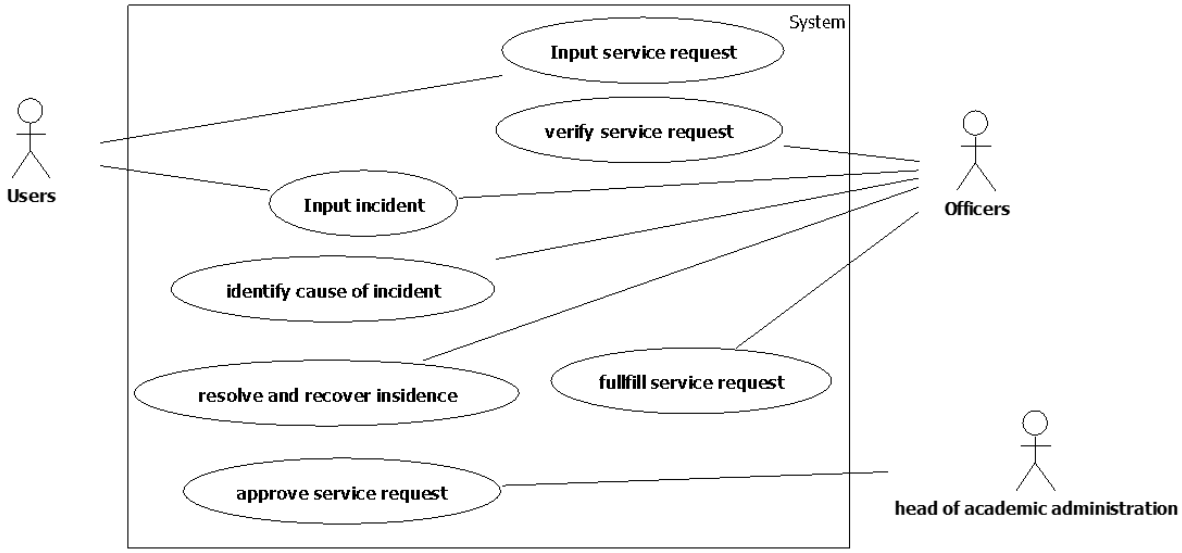


Fig. 1. Use Case Diagram

TABLE II. FUNCTIONAL REQUIREMENTS

No	Activity	Feature
1	Record, classify and prioritize requests and incidents	User may input service request and incident data
2		Users can input data according to type and category
3		Academic officers can give priority estimation to incidents and service requests
4	Verify, approve and fulfill service requests	academic officers verify service requests
5		Head of academic approves the service request
6		academic officers fulfill service requests
7	Investigate, diagnose and allocate incidents	academic officers identify the cause of the incident
8		academic officers recording new incidents
9		academic officer assign a person for incident handling
10	Resolve and recover from incident	academic officer record incident solution
11		academic officers record recovery actions
12		academic officers record incident settlement
13	Close service requests and incidents	academic officers provide notification of service request and incident settlement
14		academic officers close service requests and incidents report

B. System Design

Use case diagrams were made based on identified functional requirements. Each feature in the use case describes its activity in more detail in the use case scenario. The system activity described in the use case scenario becomes the basis for the database design.

C. Confirmation to Stakeholder

Based on system design, we created mockup of desired system. So it can get comprehensive feedback from stakeholders. With the mockup, we discussed with stakeholders to make adjustments to the system design.

The results of these confirmations include simplification of activities and roles according to scope. It is also to overcome problems of volatility or policy that change at any time. The system should be made simple, in order to easily adapt to regulatory changes. Yet, it must accord with the COBIT best practices.

Use case diagram changes are made to facilitate the stakeholder request. the revised version of the use case diagram is depicted in figure 1. There are some features from the functional requirement that are merged or eliminated. for example, priority estimation is not done by academic officers, but done by the system according to incident or service request category. assign a person for incident handling feature is deleted. all the features of the Resolve and Recover from the Incident activity are combined into one feature to simplify the process. notification of service request and incident settlement are done by the system if already resolved by officers. service requests and incidents are automatic closes if resolved by officers.

D. System Development

System design that has been improved according to the results of confirmation with stakeholders then implemented into a web-based system. The feature implementations are shown in Fig. 2. Fig. 2(a) and 2(b) are displaying the User Interface of incident report feature and resolve/recover incident feature respectively.

Functional testing on the system is done by giving a number of inputs on the system which is then processed in accordance with its functional requirements to see whether the system

produces the desired output. We implemented black-box testing for functional testing on the system. Software developers perform functional testing based on use case scenario documents.

E. Evaluation

Stakeholder's simulations session are used to evaluate the system. Stakeholders consisting of vice dean of academic (1 person), head of academic administration (1 person), and users who have conducted incident / service request reporting (8 person). Stakeholders are required to run the application in accordance with their respective roles with case studies of incident management and service requests.

The results of stakeholder evaluations are as follows: vice dean of academic provides improvements to the terms that have not standardized according to the guidelines of the existing procedures at the university, so it needs to be followed up by discussing with the university quality assurance team. Head of academic administration says that this application helps because the results can be directly printed for use as a report, but it also allows further developed by other programmers because the source code is available. Other users suggest that this application can be developed for other university departement as well, and integrated with the campus information system services.

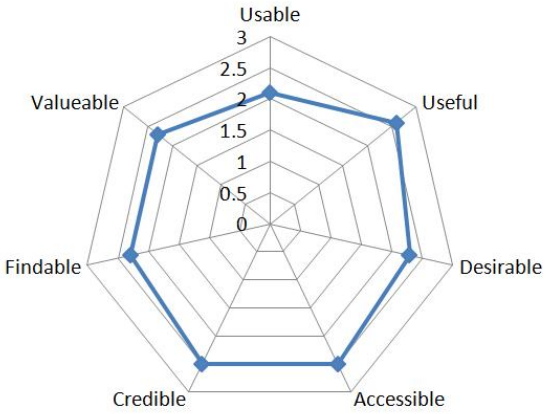
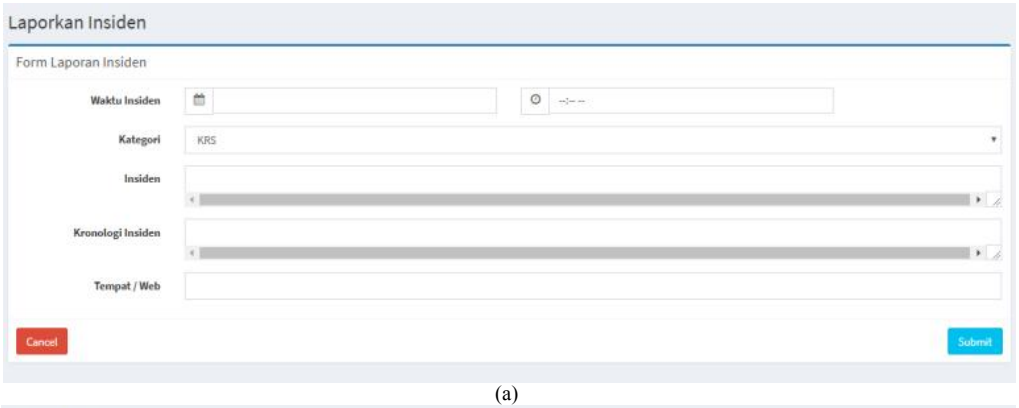
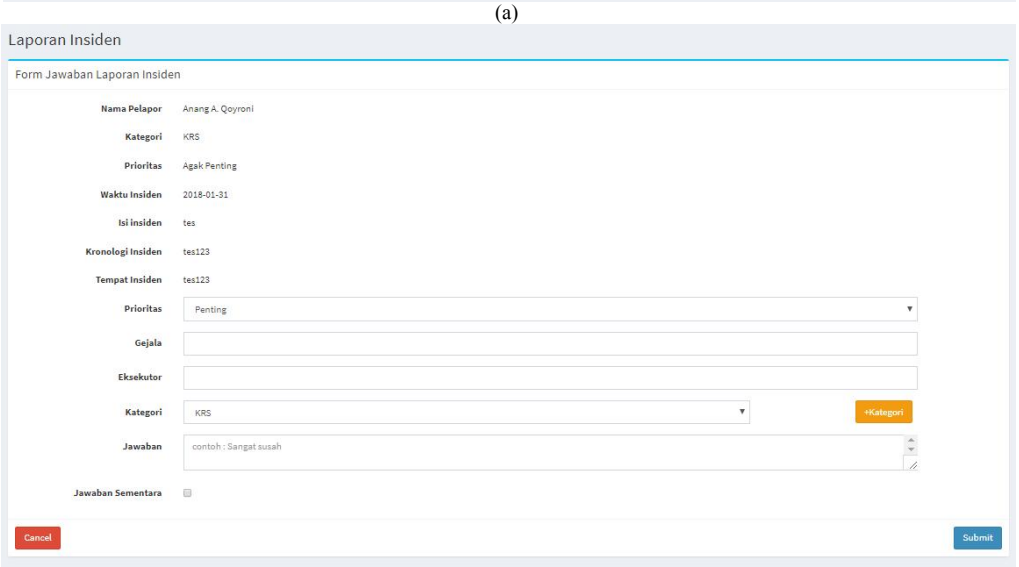


Fig. 3. Evaluation result

User experience aspect such as usable, useful, desirable, accessible, credible, findable, and valuable are also evaluated. Evaluation is done by stakeholders who are involved in the simulation session. Stakeholders fill out the questionnaire to determine the level of agreement on the user experience aspect. The questionnaire uses a Likert scale with 4 attributes: strongly agree to strongly disagree. Numbers are assigned to



(a)



(b)

Fig. 2. Screenshot of the systems. (a) UI for input of incident report. (b) UI for resolve and recover incident.

responses (0 to 3). Result of evaluation can be seen in fig. 3. All attribute providing good result; all respondent agrees that all aspects of users experience are in good form/design.

IV. CONCLUSION

Incident and service request management systems are built based on COBIT, where adapts to the needs and business processes of the existing system. The system is designed with consideration of the scope and needs of the organization. These include simplifying activities, as well as considering human resource needs.

The system design is confirmed to stakeholders before it is created, so that the system that created really suits the needs of the user. System testing is done to ensure all functions run as expected. Based on test results, all functions run as expected and no bugs or errors are found.

Simulation sessions are done by running some cases of incident reporting into the system. These simulations are done by stakeholders to evaluate the system. The stakeholder also valued user experience aspect of the system, such as: usable, useful, desirable, accessible, credible, findable, and valuable.

The results of the evaluation confirm the contribution of this study, the application of incident and service requests management in the academic information system can improve the quality and user satisfaction. It also improves the incident management process within the organization integrated into the academic information system.

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