

3. Utilization of Information System Dashboard of Internal Quality Guarantee at STT-Ibnu Sina Batam

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UTILIZATION OF INFORMATION SYSTEM DASHBOARD OF INTERNAL QUALITY GUARANTEE AT STT-IBNU SINA BATAM

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Abstract--- Human resources on the campus of STT-Ibnu Sina Batam consisting of lecturers and supporting supporters have a very strategic position, because they have a direct influence on the learning process, graduate quality and competitive output. The effectiveness of performance in teaching and learning and improvement of the academic atmosphere is strongly influenced by the standardization of quality to be achieved and the quality guarantee process that must be carried out by a university. The thing that must be met so that the implementation of a quality guarantee system at a university can be implemented properly is the availability of an accurate quality guarantee information system. The purpose of this research is to provide more quality for the campus of STT-Ibnu Sina Batam to improve security and ease in storing information, and to build a dashboard system to be able to handle and process data in real time and broadly, so that data values can be represented into a few concise pages. Dashboards also provide convenience in providing a variety of important and quality information. To be clearer in analyzing and designing a new system, the author uses the method approach of Object Oriented Analysis and Design (OOAD) by using software used to help describe the system, namely by UML.

Keywords--- Dashboard, OOAD, UML.

1. INTRODUCTION

Higher education institutions are required to make quality improvements or improvements continuously from time to time so that these standards develop continuously. The Technical College (STT)-Ibnu Sina Batam is a private institution that continues to strive to improve the quality both in terms of academic quality and administrative services[1]. In carrying out continuous monitoring and measurement of its performance in order to achieve its goals (vision and mission), the Institution of Internal Quality Guarantee (LPMI) has been displayed on the website information system[2][3]. In the website link of STT-Ibnu Sina Batam, *lpmi.stt-ibnusina.ac.id*, the website still needs to be developed because in displaying data and information is still less efficient which is still in the form of Portable Document Format (PDF) files. To display the process of monitoring data and information taken from all higher educations, it is better to need an information system that is the Dashboard system[4][5]. By implementing a good information system dashboard it is expected to become an information system that supports the performance of the LPMI of STT-Ibnu Sina Batam and can be a meaningful information system for all STT's academic community-Ibnu Sina Batam[6][7].

2. RESEARCH METHOD

2.1. Dashboard

According to Few in the journal of Januarita Dashboard is a visual display of the most important information needed by one or more of the goals, combined and arranged on a screen to become the information needed and can be seen at a glance. Visual appearance here implies that the presentation must be designed as good as possible so that the human's eye can capture information quickly and the human brain can understand its meaning correctly. The dashboard is a display on a full computer monitor, which contains critical information so that we can see it immediately, then by looking at the dashboard, we can know things that need to be known and usually a combination of text and graphics, but more emphasis on graphics[8][9].

2.2. Method of collecting data

Qualitative research is a research that is used to reveal problems in the performance of organizations of government, private, social, youth, women, sports, arts and culture, etc[10]. so that it can be used as a policy to be implemented for the common welfare[11]. cited by (Gunawan, 2016) explains that qualitative research data collection methods use in-depth interviews[12].

2.3. Data Analysis Method

The method of analysis used in this study is to use qualitative data analysis methods, which is an analysis of data that is generally in the form of statements, words or a description of something that is stated in the form of an explanation with description[13].

2.4. System Design Method

According to Booch's quoted in Prasetyotomo Methodology of Booch's Object-Oriented Analysis & Design, then abbreviated as OOAD, is a combination of 3 (three) approaches, namely: Object-Oriented Design (OOD), Object-Oriented Analysis (OOA) and Object-Oriented Programming (OOP)[14][15].

OOA is an analysis method that checks requirements based on the perspective of collecting objects and classes in a problem domain, OOD is a design method that includes the process of decomposing object and described in notation so that it can describe both static and dynamic systems models both logically and / or physical, while OOP is a method for implementing programs that are organized as collections of objects where each object is an instance of a class and the class is one of a class of hierarchically interconnected classes using inheritance relationships[16][17][18].

The relationship between OOA, OOD and OOP is: the results of modeling or collection of objects from OOA will be used by OOD and the results of OOD will be used as a blueprint to build systems using OOP.

The steps in the OOAD process are as follows:

a. Requirement

In the requirements phase explains how to make and maintain a cooperation agreement with customers and stakeholders about what must be done in making the system, for example the needs of a system such as what functions will be used by the system, what features are used, then it will be used in making the system, who are the users involved or who use the system and so forth.

b. Analysis and Design

This stage explains how to convert previously created system requirements into a form of system design. Which design is presented as a specification of system implementation in selecting the application environment? In addition, the analysis and design stage also includes developing an architecture / form of a strong design.

c. Implementation

After making a system requirement, analyze and design the system to be made. Then at this stage the system unit is implemented by combining the design with the system, the intention is to implement the design in a system or program in the form of a coding program. It also produces a system that can be run.

d. Testing

Testing is done to ensure that the system is in accordance with the needs that have been made before (those needs are applying as appropriate). Validating the function of the system that has been concretely then is demonstrated that the software product is in accordance with the needs and designs that have been made previously.

e. Deployment

Ensuring that the software product (including implementation and testing) is available for end users or can already be used by end users.

2.5. System Modeling Method

Unified Modeling Language (UML) is a tool for visualizing and documenting analysis and design results that contain syntax in modeling systems visually Braun, et.al, cited in[19]. It is also a set of modeling conventions that are used to determine or describe a software system associated with an object [20][21][22].

Types of Diagrams in UML

a. Use Case Diagram

Use Case diagram is a description of a group of interrelated and form a system that is regularly carried out or supervised by an actor. Use Case or use case diagram is a modeling to conduct (behavior) information systems that will be created Rossa M.Salahuddin ductified in Nuddin & Fithri.

Use case diagrams illustrate the expected functionality of a system. What is emphasized is "what" the system does, and not "how". A use case represents an interaction between actors and the system. Use case is a specific






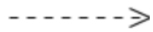

job, for example logging into the system, making a shopping list, and so on. An actor is a human or machine entity that interacts with the system to do certain jobs[23][24].

Use case diagrams can be very helpful if we are compiling the requirements of a system, communicating designs with clients, and designing test cases for all the features that exist on the system.

A use case can include other use case functionality as part of the process in itself. It is generally assumed that the included use case will be called every time the included use case is executed normally. A use case can be included by more than one other use case, so duplication of functionality can be avoided by pulling out common functionality[25][26][27].

A use case can also extend other use cases with its own behavior. While the generalization relationship between use cases shows that one use case is a specialization from another.

Table 1 Symbols of Use case Diagrams (U.S & Saladin 2011: 130) quoted by Aprianti & Maliha (2017)

FIGURES	DESCRIPTION
<p><i>Use case</i></p> 	<p>The functionality provided by the system as unit⁵ exchanging messages between units or actors; usually stated using verbs at the beginning of the phrase name of use case.</p>
<p><i>Actor</i></p> 	<p>People, processes, or other systems that interact with information systems that will be created outside the information system that will be created themselves, so even though the symbol of an actor is a picture of a person, the actor is not necessarily a person; usually stated using nouns at the beginning of the phrase of the actor's name.</p>
<p><i>Association</i></p> 	<p>The actor and use case communication that participates in the use case or use case has interaction with the actor.</p>
<p><i>Extend</i></p> <p><<Extend>></p> 	<p>The relation of an additional use case to a use case where the added use case can stand alone even without the additional use case; similar to the principle of inheritance in object-oriented programming.</p>
<p><i>Generalization</i></p> 	<p>The relation of generalization and specialization (general-specific) between two use cases where one function is a function more general than the other.</p>
<p><i>Include/Uses</i></p> <p><<include>></p>  <p><<uses>></p> 	<p>The relation of additional use cases to a use case where an added of use case requires this use case to perform its function or as a condition for running this use case.</p>

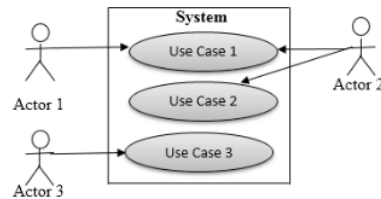


Figure Examples of Use Case Diagrams (Ropianto, 2016)

b. Activity diagram

Activity Diagram illustrates the workflow of a system or business process or menu that is in software. (Aprianti & Maliha, 2017) Activity diagrams are special state diagrams, where most states are actions and most transitions are triggered by the completion of the previous state (internal processing). Therefore the activity diagram does not describe the internal behavior of a system (and interactions between subsystems) in exact terms, but rather describes the processes and pathways of activity from the upper level in general.

An activity can be realized by one or more use cases. Activities describe the processes that are running, while use cases describe how actors use the system to do activities. Like the state, the UML standard uses rectangles with rounded corners to describe activities. Decision is used to describe behavior in certain conditions. To illustrate parallel processes (fork and join) an synchronization point can be used which can be a point, horizontal or vertical line. Activity diagrams can be divided into several swimlane objects to illustrate which objects are responsible for certain activities.

c. Class Diagram

Class diagram illustrates the system in terms of defining the classes that will be created to build the system. Classes have what are called attributes and methods or operations. (Rossa M.Salahuddin, 2011) in a journal (Salahuddin & Fithri, 2015)

Class is a specification that if instantiated will produce an object and is the core of object-oriented development and design. Class describes the state (attributes / properties) of a system, while offering services to manipulate the state (method / function).

Class diagrams illustrate the structure and description of classes, packages and objects and their relationships with each other such as containment, inheritance, association, and so on. Class has three main areas:

1. Names (and stereotypes)
2. Attribute
3. Method

Attributes and methods can have one of the following properties:

1. Private, cannot be called from outside the class involved
2. Protected can only be called by the class concerned and the children who inherit it.
3. Public can be called by anyone.

Class can be an implementation of an interface, which is an abstract class that only has a method. The interface cannot be instantiated immediately, but must first be implemented as a class. Thus the interface supports the method resolution at run-time.

The following is the relationship between classes:

1. Association is a static relationship between classes. Generally it describes a class that has attributes in the form of another class, or a class that must know the existence of another class. Navigability arrows indicate the direction of the query between classes.
2. Aggregation is a relationship that states a part ("consists of").
3. Inheritance is a hierarchical relationship between classes. Class can be derived from other classes and inherit all the attributes and methods of the original class and add new functionality, so that it is called a child of the class it inherits. The opposite of inheritance is a generalization.

4. A dynamic relationship, which is a series of messages that are passed from one class to another class. Dynamic relationships can be described using sequence diagrams which will be explained later.

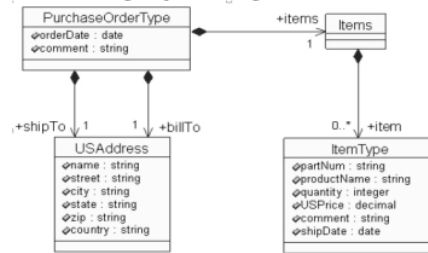


Figure Example of Class Diagram (Ropianto, 2016)

d. Sequence Diagram

Sequence diagrams explain the interaction of objects arranged in chronological order. Easily the sequence diagram is a step-by-step picture, including the chronology (sequence) of logical changes that should be made to produce something in accordance with the use case diagram (Ropianto, 2016). Sequence diagrams depict interactions between objects in and around users, displays, etc. in the form of messages that are represented by time. Sequence diagrams consist of vertical dimensions (time) and horizontal dimensions (related objects). Sequence diagrams are used to illustrate a scenario or series of steps performed in response to an event to produce a certain output. Starting from what triggers these activities, what processes and changes occur internally and what outputs are produced. Each object, including the actor, has a vertical lifeline. Message is described as an arrow line from one object to another. In the next design phase, the message will be mapped to the operations / methods of the class. Activation bar shows the length of time a process is executed, usually starting with the receipt of a message.

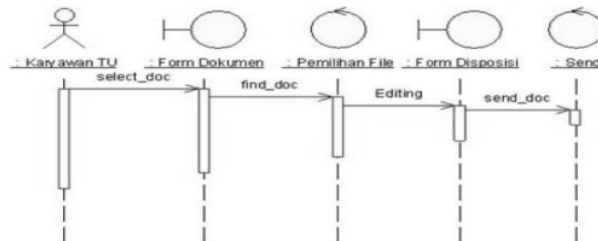


Figure Notation Sequence Diagram (Ropianto, 2016)

e. User Interface

is an important component of every new system that will be used. User Interface is part of the information system that requires direct interaction with the user system in making input and output. In creating a user interface there are rules called eight golden rules. Eight golden rules are useful in designing interactive user interfaces.

3. RESULTS AND DISCUSSION

3.1. Data collection

Based on observations directly on the campus of STT-Ibnu Sina Batam and interviews with the Chairperson of STT Ibnu Sina Batam and the Chairman of the Institution of Internal Quality Guarantee (LPMI), Ms. Marlina Umar S. Kom, the data obtained will be processed for the utilization of the Information System of the Guarantee Dashboard Internal Quality in STT-Ibnu Sina Batam.

Primary data obtained from in-depth interviews are as follows:

1. Design of the Dashboard of LPMI in STT-Ibnu Sina Batam.
2. Use of Dashboard System in STT- Ibn Sina Batam.

B. Secondary Data

Secondary data obtained from direct observations are as follows:

1. Information of LPMI in STT-Ibnu Sina Batam can be found on the website.
2. Information System Presentation is seen on the website, students' email.

3.2. Data processing

In conducting interviews with the chairman of STT-Ibnu Sina Batam and the chairman of LPMI, it can be concluded that there is a need to improve the system for delivering information posted on the website of STT-Ibnu Sina Batam, especially regarding internal quality guarantee agency information, the following conclusions from the interview:

1. Display data and information on the website of LPMI of STT-Ibnu Sina Batam at this time still in the form of Portable Document Format (PDF) so that it is less efficient in displaying the process of monitoring and evaluation of LPMI of STT-Ibnu Sina Batam

2 The absence of a dashboard design as an information system that supports the performance of the LPMI of STT-Ibnu Sina Batam and a meaningful information system for the entire academic community of ST-Ibnu Sina Batam.

3.3. System Development

The method used in system development is the Object Oriented Analysis and Design (OOAD) method with the UML (Unified Modeling Language) modeling method.

3.3.1. Requirement

These requirements explain the operational use case that will be directly involved with the dashboard of LPMI of STT-Ibnu Sina Batam. Where actors who will enter the system must log in to the admin of LPMI actor and chairman of STT-Ibnu Sina, while lecturers and students do not need to, the following are some actors who will use the system:

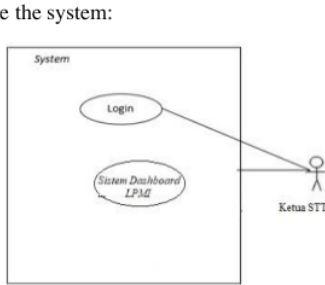


Figure. Proposed Use Case System.

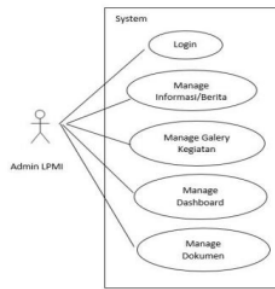


Figure. Use Case Admin of LPMI

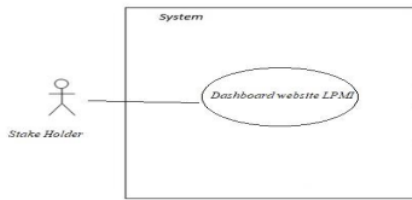


Figure. Use Case Stakeholder (Students, Lecturers)

3.3.2. Analysis and Design

1. Use Case Running

Analysis of the running system is a stage that gives an overview of the system that is currently running. This analysis aims to provide a more detailed description of how the workings of the current system

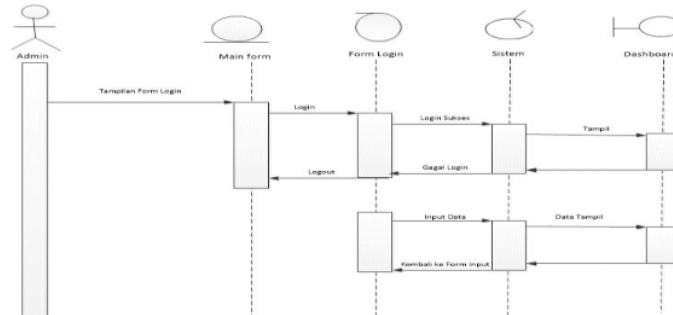
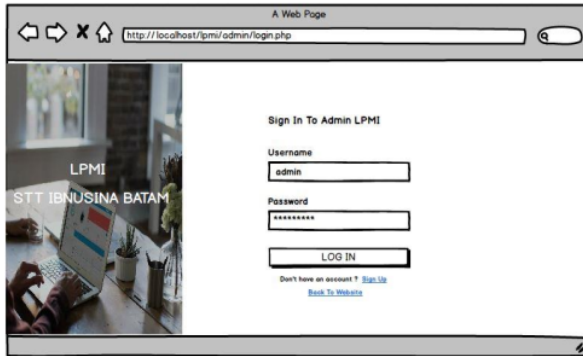


Figure. the Dashboard Sequence Diagram of LPMI

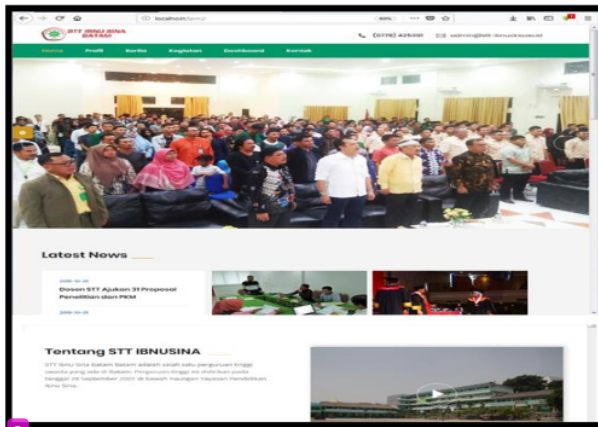
Planning of System Design Interface

Interface design is an important aspect in application design, because it deals with appearance and interaction that makes it easy for users to use it. The interface design of this system is as follows:

- a. Login Form Design and b. Main Display Design



Implementation Results



4. CONCLUSION

Based on the background, research and discussion conducted on the use of the dashboard of the Information System of Internal Quality Guarantee on the campus of STT -Ibnu Sina Batam, the conclusions can be drawn as follows:

1. To design an information system dashboard of the Institution of Internal Quality Guarantee (LPMI) at STT-Ibnu Sina Batam, the author first analyzes the running system, designs a new system, and then implements it into the programming language.
2. Implementation of the dashboard design of the information system of LPMI at STT-Ibnu Sina Batam is done by building an information system that contains information data and a dashboard of audit results from LPMI at STT-Ibnu Sina Batam.

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ORIGINALITY REPORT



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