Information System of Processing Data Toward Society for Research Center and Society Services (P3M) at STAIN Batusangkar

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Abstract
Research information system and society services at P3M STAIN Batusangkar used to managing and organizing the data of the research outcomes and services conducted by lecturers at STAIN Batusangkar with information generated by the information system by means of system planning of the Unified Modeling Language (UML) oriented on an object or modeling concept object Oriented (OO), research and society services is only used at P3M STAIN Batusangkar, Lecturers, Study Program and Faculty can obtain the information needed, especially with regard to the results of the research and dedicated to the society that have done well for the purposes of lecturer concerned or used by the Study Program and Faculty.

Keywords: Information system; UML; P3M

INTRODUCTION
Research and Service Center is a unit of activity that serves to manage all research activities and community service carried out by lecturers in terms of improving the quality of the lecturers. At this time the research outcomes and dedication are still managed by using Microsoft Excel and Word. Data recording can be done on many different files that can be stored in different places. This result need a long time when manipulation of the data to report arrangement. It is might be caused the mistakes both intentional and unintentional. Besides, the data management of the research and services like this can lead to data integrity and security are not guaranteed. Here computerized data management with a specific application program is necessary to support an information system that is fast and accurate, so that the problem of time and the validity of the research and community services can be minimized.

In addition, the information needs by the Research Center and Services is very necessary in rapid and high degree conditions of information accuracy to support the development of the faculty itself in particular and STAIN (Sekolah Tinggi Agama Islam Negeri) Batusangkar in general. For example, delays in doing presentation of information such as the recapitulation per study program may hamper the preparation of accreditation reports. Another problem that often arises, the fault of information relating to the identity of the researcher, the amount of research that has been done grouping of research data and community service activities. This occurs because of data recording is still manual and stored in many files that caused the integrity and validity of the data is not secured properly.

The previous research has been conducted by Ari Muzakir. It is discussed about research data and society services, but it still not details yet because describe the case in general term. Furthermore, to knowing the complete reviewer data, lecturer data and society services data, they should rewrite to develop information system about lecturer data include lecturers profile and reviewer data as guidance who worthy being a reviewer at P3M STAIN
Batusangkar. Additionally, community services data has been designed lead for Islamic Higher Education rules of Religious Affairs Minister around about, especially, STAIN Batusangkar.

Based on observations conducted at P3M STAIN Batusangkar, it can be inferred as follow "How to shape a computer-based information system that can be used in managing data for Research and Community in solving the problem of P3M STAIN Batusangkar?"

The purpose of the research is to shape a computer-based information system to managing research, and community services at P3M STAIN Batusangkar are expected to ease in managing and organizing the research outcomes and services that help faculty and study program in obtaining the information needed. System design can be intended as the stage after the analysis and circle system development, definition of functional requirements, preparation for building design implementation, describes how a system can be in the form of depiction, planning, design sketches or arrangement of several separate elements into a single unit functioning, including configuring the software components and hardware system. (Jogiyanto HM, 2001: 197).

Robert J.Varzelo / John Reuter III in Jogiyanto stated system design is the stage after the analysis of the development cycle system, definition of functional requirements and preparation for design implementation and describe how the system was established. Agreeing with the opinion of Robert J.Varzelo / John Reuter III, Nugroho (2005) states the design of the system is the steps being taken after analysis of the system. The design of the system is the initial stage in which the initial approach to solve the problem and develop the best solutions for the problems that exist and according to Joe Valacich (2012) development of the system was to develop a new system to replace the old system as a whole or improve existing systems.

From the explanation above, the writer sum up that the design of the system is one part of the system development phase conducted after analysis of the system, which aims to define and describe the system or software, or software that is formed.

**METHODS**

Modeling is the process of designing the software before coding (coding). Make a model of a complex system is very important in order to understand the system as a whole. The more complex a system is, the more important it used as a good modeling techniques. Using the model, the expected development of the software can meet all the needs of users with a complete and precise. The success of a modeling software is determined by three elements, namely notation, process, and the tools used (Dharwiyanti, 2003).

Based on the explanation above, the writer used the design system of object-oriented by using the Unified Modeling Language (UML). Nugroho (2005) argues UML is a language for visualization, specification, construction and documentation. Correspondingly, Dharwiyanti (2003) states the UML is a language that has become the standard industry for visualizing, designing, and documenting software systems. UML offers a standard for modeling a system.

UML is an object-oriented modeling in designing a system, but can be used for modeling procedural applications. The statement was supported by Dharwiyanti (2003) using UML can be made a model for all kinds of applications software devices where the application can run on any hardware, operating system and any network as well be written in any programming language, because basically UML also use the class and operation concepts, it is more suitable for writing software in object-oriented languages. Every complex system should be viewed from the different perspective so that it can obtain a through understanding. UML diagram that provides nine types of class diagrams, object diagrams, Use Case Diagram, Sequence diagram, Collaboration Diagram, State chart Diagram, Activity Diagram, Component Diagram, Development Diagram (Nugroho, 2005). However, Sulistyorini (2009) states all nine diagram is not absolutely have to be used in software development, all made based on the needs.

**Use Case Diagram**

Use Case Diagrams are static, this diagram shows a set of use cases and actors (a special type of class). The diagram is very important to organizing and modeling the behavior system that is needed and expected of user (Nugroho, 2005).
Table 1: The symbols used in Use Case Diagram

<table>
<thead>
<tr>
<th>No</th>
<th>Symbols</th>
<th>Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Actor</td>
<td>Specifying the set of the roles that users play when interacting with a use case.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Use Case</td>
<td>Description of the sequence of actions displayed by system that produces measurable results for an actor.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>System</td>
<td>Specifying package featuring a limited system.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Dependency</td>
<td>Relationship where changes occur on a dependent element will affect the elements that depend on independent elements.</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Generalization</td>
<td>Relationship where the object of the descendant to share the data structure and behavior of objects above the ancestor.</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Include</td>
<td>Specify the source use case explicitly.</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Extend</td>
<td>Specify the target use case extend the behavior of the source at a given point.</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Association</td>
<td>Linking between one object with another object.</td>
</tr>
</tbody>
</table>

Class Diagram

Class is a specification that will make both the object and the core of development and object-oriented design. Class describes the state (attribute / property) system. Class diagram describing the structure and description class, package and their relationship to others (Dharwiyanti, 2003).

Table 2: Class Diagram Symbols (Grady Booch, 2005)

<table>
<thead>
<tr>
<th>No</th>
<th>Symbol</th>
<th>Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Class</td>
<td>The set of objects that share the same attribute and operation.</td>
</tr>
<tr>
<td>2</td>
<td>Association</td>
<td>Nary Association</td>
<td>Attempt to avoid the association with more than two objects.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Association</td>
<td>The relationship between static class that describes the classes that have attribute such other class or class has known the existence of other classes.</td>
</tr>
<tr>
<td>4</td>
<td>Generalization</td>
<td>Generalization</td>
<td>Relationship where the object of the descendant to share the data structure and behavior of objects above the ancestor.</td>
</tr>
<tr>
<td>5</td>
<td>Dependency</td>
<td></td>
<td>Relationship where changes occur on a dependent element will affect the elements that depend on independent elements.</td>
</tr>
</tbody>
</table>
Activity Diagram
Grady Booch (2005) stated, an activity diagram is essentially a flowchart, showing flow of control from activity to activity, activity diagram is essentially similar to the flow chart or flow chart showing the control flow of an activity to another. In the activity diagram has an actions or activities, activity nodes, or stream flows, and objects.

Table 3 Activity Diagram Symbols

<table>
<thead>
<tr>
<th>No</th>
<th>Symbols</th>
<th>Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Activity</td>
<td>Show how each class interface to interact for each other</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Decision</td>
<td>Option for making decision.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Initial Node</td>
<td>the starting point</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Activity Final Node</td>
<td>The final point</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Fork</td>
<td>Show the activities carried out in parallel or to combine the two activities into one</td>
</tr>
</tbody>
</table>

Fig. 1: Conceptual Framework

RESULTS AND DISCUSSION
System analysis by using the flow of information system is the first step to making design system. Based on analysis has been known the system weaknesses that need to be designed the new system.
System analysis aims to understand the system, know the system deficiencies and determine the needs of the system has been built. System analysis will determine the user analysis, software requirements, system requirements, modeling, analyzing and evaluating the current system. Ongoing system analysis will be described using a UML diagram (Unified Modeling Language). At this stage the writer will be analyzed the system that is running on the Research Unit and Services at STAIN Batusangkar.

Use Case is a model that describes the processes of an organization and the process of interaction with outsiders. Figure 2 is an overview of the system is running on the Research Center and Community Services (P3M) STAIN Batusangkar.

Based on the background and identification of the problem that have been discussed in Introduction, the writer proposes a system that can help processing research data and society at P3M STAIN Batusangkar. Analysis system proposes are starting from data management of lecturer, reviewer and community data services, then the staff of processing data and research data community services. Further, the data have been entered and we did transaction processing research data on community services at P3M Batusangkar STAIN.

The user who plays a role in processing data of research application and community services are:
Table 4: Role of users

<table>
<thead>
<tr>
<th>No</th>
<th>User</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P3M</td>
<td>1. Input lecturer data, reviewer, research, mosque, school, town and data services.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Printing lecturer data, reviewer, research and community services data of each year</td>
</tr>
</tbody>
</table>

Use Case diagram portrays the functionality of expected system which is done rather than how Use Case diagram that shows the interaction between user with the system Figure 3 Use Case Diagram at P3M STAIN Batusangkar.

![Use Case Diagram](image)

**Fig. 3:** Use Case Diagram P3M STAIN

Activity Diagram illustrates the activity of system. In Figure 4 a portrait Activity Diagram at P3M STAIN Batusangkar.
Sequence diagram and Collaboration diagram are equally shows the interaction and flow of messages between the objects. In collaboration diagram, the message will be numbered.

**Fig. 4:** Activity Diagram at P3M STAIN Batusangkar.
Fig. 5. Sequence diagram of the research

Fig. 6: Sequence diagram of dedication (School, Town and were deleted)

Class Diagram is depicting the structure of the system in terms of defining the classes that will be made to shape system.
After analyzing the current system as well as doing research, it can be designed an information system that is expected to improve the effectiveness and efficiency of work on the part of processing data of Lecturer Research and Community Data Services at P3M STAIN Batusangkar, where the whole of the system will be implemented in the form of implementation program, the program structure is designed as follows:

**Fig. 7: Class Diagram.**

**Fig. 8: Program Scheme**
In each processing needs the data input, where the data to be processed must be entered in advance, of course, through the interface between user with hardware and software. To facilitate and avoid errors, therefore the writer has been designed the display of shape menu that is easy to use to enter the data. Here is the form of the draft has been designed:
CONCLUSION
From the research that has been done, it can be concluded as follows:
1. The disadvantage of the old system because there are many information errors related to the identity and amount of the research data and community services that has been done, it appears that data recording is still manual and a lot of data stored in many files so that the data validation not be protected properly.
2. The new design system, which uses Visual Studio 2010 application program in the processing research data and community services easily available and the data can be organized as well.
3. Possible future development of the system by designing a web-based information system or web database in order to access information by internet.
REFERENCES


