Designing Information System for Student Practicum Assessment in the Laboratory

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Abstract. Practicum assessment process at the Laboratory in some university still uses conventional methods ranging from processing practicum value data to presenting assessment information. This certainly can cause various problems that can hamper activities and services in the laboratory. One of the efforts that can be done to improve the practicum assessment process is by designing a practicum assessment information system. The purpose of designing a practicum assessment information system is to identify the information system of current practicum assessments, analyze information system needs, design and build a practicum assessment information system in the Information Systems and Decision Laboratory. The method used in the design of information systems is the Framework for the Application of Systems Thinking (FAST) with the Model Driven Development Strategy model. The FAST method consists of several stages ranging from scope definition, problem analysis, requirements analysis, logical design, decision analysis, physical design, development and testing, implementation and delivery, system operation and maintenance. The design of the proposed improvement of the practicum assessment system in the process block using Data Flow Diagrams (DFD) to get the architecture processes in the practicum assessment system application. The data block uses the Entity Relationship Diagram to design a practicum assessment database system. The communication block uses the Use-Case Diagram design model to get the interface design from the practicum assessment system. The construction of a practicum assessment information system is carried out using XAMPP tools to access the Apache server and the MySQL database and Sublime Text is used to build application interfaces using HTML and PHP programming languages. So that the results of designing the information system for practicum assessment using information technology can be obtained which can be a medium for processing and presenting practical values in the laboratory, which are easily accessible to users and improve aspects of the PIECES framework including performance, information, economy, control, efficiency and service.

Keywords: FAST, DFD, Entity relationship diagram, XAMPP

1. Introduction
Customer satisfaction is one of the important factors for an organization, especially those engaged in education or academics. There are many advantages to be gained if an organization can manage good relationships with customers, one of which is that it can improve operational efficiency in activities carried out in the organization. The field of education, especially at universities, is one area that is closely related to customer relations because customer satisfaction can be one of the determinants of
student graduation at a university. Factors that can influence customer satisfaction are divided into several aspects according to the PIECES framework, including performance, information, economy, control, efficiency, and service. So it takes an effort to be able to manage each of these aspects in order to increase customer satisfaction. At present, efforts have been made to increase customer satisfaction at various universities, one of which will be implemented in the Laboratory of Information Systems and the Decision of Bandung Islamic University.

The Information System and Decision Laboratory is one of 4 laboratories in the Industrial Engineering of Bandung Islamic University. The laboratory is engaged in information systems that provide information about matters related to information technology. Activities carried out in the Information Systems and Decisions Laboratory related to customer relations. The term customer in the laboratory is defined as an entity that is interconnected with each other, namely between student entities, regulatory bodies and laboratory assistant entities. The service used with one process is practicum.

Practicum assessment process in the Information Systems and the Decision Laboratory still uses conventional methods ranging from processing practicum value data to presentation of assessment information. This certainly can cause various problems that can hamper activities and services in the laboratory. One of the efforts that can be done to improve the practicum assessment process is by designing a practicum assessment information system. The application of information technology as a means to design an assessment information system can assist in the various processes that exist in the assessment of practicums such as value input by practicum assistants, database of storing practicum values, presentation of practicum values and also the reporting process of the value of practicum activities and reports of large assignments to lecturers. So that the output of this study is designing an assessment system in the Information and Decision System Laboratory.

The research objectives to be achieved are based on the formulation of the problems described above, namely:
1. Identify the practicum assessment information system that is running in the Information Systems and Decision Laboratory
2. Analyzing the needs of the practicum assessment information system in the Information Systems and Decision Laboratory.
3. Design an information system for practicum assessment in the Information Systems and Decision Laboratory.
4. Establish a practicum assessment system in the Information and Decision System Laboratory

2. Method
The method used in information system design is the Framework for the Application of System Thinking (FAST) method, using a Model Driven Development Strategy. The stages of the FAST method can be seen in Figure 1

As for the explanation of the stages of the FAST method, namely:
1. Phase 1 - Scope Definition
   Determine the limits of system development by identifying problems, initiatives and objectives. There are two objectives of the scope stage, which is answering the question of whether this problem is sufficiently valuable and setting the size, vision, constraints or limitations of what is needed, as well as the budget and schedule of the project.
2. Stage 2 - Problem Analysis
   Problem analysis is the stage of studying the existing system and analyzing the findings in order to find a deeper understanding of the problems that triggered this project.
3. Stage 4 - Logic Design (Logical Design)
   In the logical design stage is translating business needs into the system model. The term logical design is defined as independent technology.
Analysis of where the meaning of the image describes the system independently of every possible technical solution, the needs of the desired business model must be met by the technical solutions that want to be considered.

4. Stage 5 - Decision Analysis (Decision Analysis)
   Given business needs and logical system models, there are usually many alternatives for designing a new information system to meet these needs. The purpose of this phase is to identify the choice of technical solutions, analyze the solution to the feasibility of the choice, and recommend the choice of system to be designed.

5. Stage 6 - Physical System Design (Physical Design and Integration)
   After the solution is chosen by management, the next step is to transform the business needs in the form of physical specifications that will guide system design.

6. Stage 7 - Development and Testing (Construction and Testing)
   The purpose of this phase is to test the systems that have been developed to determine the level of acceptance of the business processes and system users.

7. Stage 8 - Installation and Delivery (Installation and Delivery)
   This activity is the process of installing software and hardware, socialization and documentation creation.
8. Stage 9 - System Operation and Maintenance
   The final step in the system development cycle is maintenance activities, and also follow up if there are new needs.

3. Result

3.1. Modeling Interfaces Using Usecase Diagrams
The system communication model is described using a use-case diagram. Use-case is an interaction that is carried out or received by an actor and relationship that connects the actor and use-case so that the functions in the system will be known. Use-case diagram consists of several components, namely use-case, actor, and relationship (relationship). As for data modeling with the use-case diagram can be seen in Figure 2

![Figure 2. Use-Case System Functional Needs Diagram](image)

3.2. Modeling the Process Using Data Flow Diagrams
Context diagram describes the relationship between 3 entities, including assistants, practitioners and lecturers. The system context diagram can be seen in Figure 3

![Figure 3. Context Diagram](image)
DFD level 1 is a subsystem from the context diagram of the practicum assessment system. There are 8 processes of flow and data storage. The level 1 DFD can be seen in Figure 4.

Figure 4. Data Flow Diagram Level 1

Level 2 DFD for practicum assessment process there are 5 sub-processes. The level 2 DFD for the practicum assessment process can be seen in Figure 5
4.1 Preliminary Task Assessment Process (PHP & HTML)

4.2 The Process of Evaluating the Preliminary Practicum Test (PHP & HTML)

4.3 The Assessment Process of the Practicum Final Test (PHP & HTML)

4.4 The Process of Appraising Practicum Activity (PHP & HTML)

4.5 Recapitulation of Final Practicum Values (PHP & HTML)

Figure 5. Data Flow Diagram Level 2 for Practicum Assessment

DFD level 2 for the presentation assessment process there are 5 sub-processes. The level 2 DFD for the presentation assessment process can be seen in Figure 6.

7.1 Reading & Al-Qur'an Recitation Assessment (PHP & HTML)

7.2 Assessment of Design Results (PHP & HTML)

7.3 Assessment Report & Assistance (PHP & HTML)

7.4 Application Report & Assistance (PHP & HTML)

7.5 Recapitulation of Final Presentation Values (PHP & HTML)

Figure 6. Data Flow Diagram Level 2 for Presentation Assessment
3.3. The System Interface
The system interface in program creation refers to the interface design that has been designed beforehand. The description of the system interface for assistant users can be seen in Figure 7.

![Figure 7. User Assistant System Interface](image)

4. Analysis
The description of the problem based on PIECES analysis on the previous system has changed and improved on each framework when compared to the proposed system designed. The PIECES analysis for the proposed system is based on performance, information, economy, control, efficiency, and service. The PIECES table is shown in Table 1.

| Framework     | Analysis                                                                 |
|---------------|--------------------------------------------------------------------------|
| Performance   | The time needed to manage practicum assessment data is faster than before |
| Information   | Data is stored safely because of the database system and avoid data manipulation |
| Economy       | Paper expenses can be reduced because the practicum card printing process is done by the practitioner |
| Control       | There are security systems such as passwords and value controls being more accurate because they are witnessed by all entities |
| Efficiency    | Making practicum cards automatically and directly printing |
| Service       | Practical values can be accessed easily anywhere and anytime as long as connected to the internet |

5. Conclusion
Based on the results of the research that has been done, then some things that can be concluded are:
1. The practicum assessment system that runs in the Information System and Decision Laboratory is currently still using a conventional system, starting from the practicum card manufacturing process, the process of inputting practicum values on practicum cards and on computers, up to the making of practicum assessment reports. So that the problems faced by the laboratory include the time needed to manage practicum appraisal data relatively long, there is a risk of data loss, there
are paper expenses for printing practicum cards, and there is no security system so anyone can access the system easily.

2. The need for an information system for practicum assessment in the Information and Decision System Laboratory, which is a system that can facilitate the processing of practicum value data, provide storage and data security values that can only be accessed by certain parties, and facilitate the presentation of practicum value information.

3. Designing proposals for improvement of the practicum assessment system on the block process using Data Flow Diagrams (DFD) obtained the results of architectural processes in the application of practicum assessment system. Data blocks using Entity Relationship Diagrams obtained the results of the practicum assessment database system consisting of assistant tables, students, lecturers, practicum assessment, presentation assessment, registration and major assignments. The communication block uses the Use-Case design model diagram obtained by the interface design from the practicum assessment system.

4. Development of practicum assessment information system is carried out using XAMPP tools, MySQL database and Sublime Text generated web-based practicum assessment system consisting of features such as login, input practicum values, input presentation values, large task data input, import data to excel, print cards practicum, assessment information and grading chart. Testing of the practicum assessment system that has been built can work well and is ready to be implemented.

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