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Development of a Web-Based Financial Information System for Independent Educational Accreditation Institutions

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ABSTRACT

Accreditation of study program is an assessment of the governance of education and teaching conducted in a study program at a university and is carried out periodically. It has been carried out by LAM (Independent Accreditation Instituton) under the supervision of BAN-PT (National Accreditation Board for Higher Education) based on the Regulation of the Minister of Education and Culture Number 5 of 2020 concerning the accreditation of study programs and universities, article 1, point 4. Specifically, the education science-based study program is organized by Independent Educational Accreditation Institution (LAMDIK) and, during a year, a number of 500 study programs must be accredited with different implementation periods. With LAMDIK's bigger responsibility, a financial information system is required to facilitate users in managing finances for both the organization's budget system and accreditation activities. SisKeu is LAMDIK's financial information system developed based on the website and integrated with LAMDIK information. In connection with the development and implementation of the Waterfall method using the programming language PHP framework Laravel and MySQL database, SisKeu has two major features namely budgeting for the operations of LAMDIK organization and financial management in the accreditation process.

Keywords: Accreditation, Finance, Web.

1. INTRODUCTION

Based on the Regulation of the Minister of Education and Culture Number 5 of 2020 concerning the accreditation of study programs and universities, article 1, point 4, LAM (Independent Accreditation Institution) is an institution formed by the government or the community to independently accredit study programs at higher education. It is formed based on clumps, trees, and branches of sciences. One of its duties and authorities is to conduct Study Program Accreditation. In carrying out its duties and authorities, it may appoint a team of assessors, a team of experts, and an adhoc committee. Government LAM is formed by the Minister on the recommendation of BAN-PT and is responsible to the Minister. In conducting accreditation, it has its independence. In addition, there is also Community LAM, which is formed by professional organizations and non-profit legal entities.

Independent Educational Accreditation Institution (LAMDIK) is one of the Community LAMs established by the community from many elements of Higher Education with education focuses. It has the authority to carry out accreditation and guidance from various tertiary education study programs in Indonesia.

Based on data on educational study programs from various strata (S1, S2, and S3) and the expiration date of different BAN-PT accreditation, an Accreditation Management Information System (SIMAk) is needed to manage the accreditation process for each accreditation application from the Study Program Management Unit (UPPS). From each accreditation process, there will be an inflow and outflow of budget at LAMDIK that must be

managed properly and transparently. For recording financial transactions, a LAMDIK's Financial Information System (SisKeu) is required along with the Accreditation Management Information System (SIMAk) as an application for managing the implementation of study program accreditation at LAMDIK.

2. METHODS

2.1. Financial System

LAMDIK is part of the Community LAMs, so that in the development of any information system, especially the Financial System, it must consider accountability, transparency, and accountability. So, to fulfill the three aspects, it was necessary to include a well-organized and good method of financial/accounting system to easily make financial reporting. There were 2 functions that used the financial/accounting method, namely:

2.1.1. Budgeting

This field dealt with the preparation of financial plan regarding the company's activities for a certain period of time in future along with its analysis and control. A financial plan could be a short, medium, or long term. It could also be classified into strategic, operational, and tactical plans. The budget was a means to describe the company's goals into financial plans, especially operational ones. The budget contained a plan of activities carried out in future and the value of money involved in it. If this plan was compared with its realization, then it could be a control medium for the company. Budgeting was a part of management accounting [4].

2.1.2. Management Accounting

This accounting type dealt with information and analysis for solving specific problems faced by company management. The central point in management accounting was information for company management. Some of the objectives of management accounting were controlling company activities, monitoring cash flows, and assessing alternatives in decision making. Company control through activity-based management was a new trend in management accounting [4].

In recording financial or accounting transactions, accounting account code references was used to facilitate the classification of budget items, or known as CoA (Chart of Account).

2.2. Web-based Application Development Technology

Web-based application was an information system that supported user interaction through a web-based interface. Its features were usually in a form of data persistence to support transactions and dynamic web page composition that could

be considered as hybridization, which was between hypermedia and information systems [1].

Table 1 Chart of Account.

Code	Accounting Master Code
1.	Assets
2.	Obligation
3.	Capital
4.	Income
5.	Burden

Web or www (World Wide Web) was a collection of connected documents stored on the internet and accessed using HTTP (HyperText Transfer Protocol). Internet users could take advantage of various kinds of information facilities at low cost without having to come directly to the place. Information or documents that could be accessed were in the form of text, image, animation, video, sound, or a combination of them. Moreover, the communication could be done by voice and video at the same time [2]. These documents along with the script program and database were hosted on a web server that was connected to the internet network and was given a domain name, so that clients could access these documents through an internet browser application.

Information systems could not be separated from the need for data storage in databases, and programming languages functioned to carry out processes related to functions programmed in the information system, including interacting with databases. In web application development technology, there were programming languages that were reliable and easy to use, namely PHP and MySQL for the database.

Laravel was one of the best PHP frameworks developed by Taylor Otwell. It was an MVC (Model View Controller)-based website development written in PHP programming language designed to improve software quality by reducing maintenance and initial development costs, while also providing an sophisticated, clear, and time-saving syntax. [3]

MVC was an architectural concept in the development of web applications divided into three parts; Model, which functioned to organize and prepare data from the database according to the instructions from the controller; View, which served to present information to the user according to the instructions from the controller; and Controller, which regulated what the model and view should display based on user's requests.

2.3. Information System Development Method

2.3.1. Requirements Definition

It aimed to identify and determine functional and non-functional requirements for the implementation of business processes related to the developed information system.
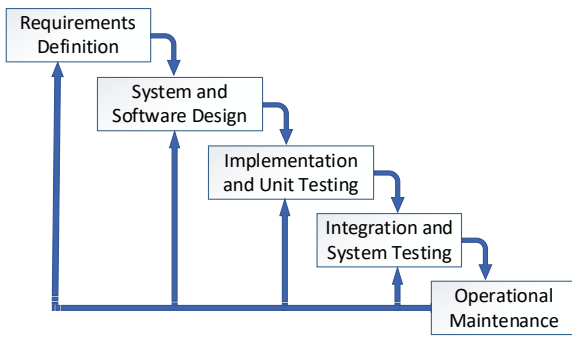
Figure 1 Waterfall method.

Functional requirements included:

a) Data of accreditation process and activity
b) Data of financial transaction in accreditation activities
c) Data of organizational financial transaction
d) Data of SisKeu users
e) LAMDIK Regulations and Organizational Structure

In addition, non-functional requirements included hardware and software. Hardware included a laptop or PC (Personal Computer) for the application development process, and a web server for hosting all application documents so that users could use them on the internet (deployment).

The software included Apache as a web server, PHP as a programming language, MySQL as a database, and an internet browser for users to access web-based applications. Long-term software development used Laravel framework because of its convenience, various web process requirement features, and relative program updates.

2.3.2. System and Software Design

This stage gave a big picture of the SisKeu's role towards its entity namely SIMAK, users, and the management of banking accounts.

UPPS (Study Program Management Unit) was a user of SisKeu from study program managers who accredit LAMDIK. The process and features carried out and obtained by UPPS related to SisKeu encompassed:

a) Bills for registration payment, adequacy assessment, field assessment, and appeal
b) Payment confirmation
c) Study program's internal transaction reports

Meanwhile, the process and features carried out and obtained by assessors related to SisKeu included:

a) Confirmation of honorarium payment
b) Transaction reports per assessor related to accreditation assessments carried out

In the organizational structure of LAMDIK management, there were a Chair, Secretary, Treasurer, and Directorate for operational functions. There were fur directorates, namely:

a) Accreditation Directory
b) Directorate of Resources & Administration
c) Directorate of Development & Evaluation

d) Directorate of Information Technology & Data
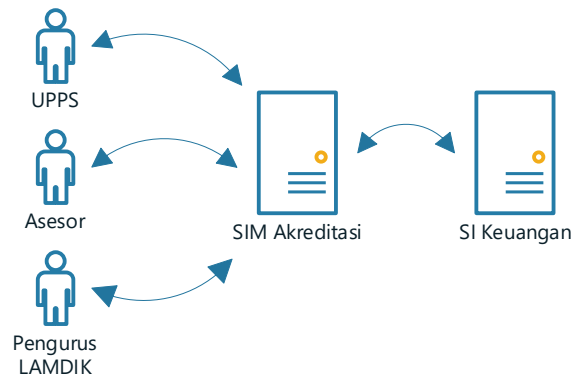

Figure 2 SisKeu in LAMDIK entity.

Because the authority of each user in the application features was different, the SisKeu security factor was required an authentication and authorization system along with an SSO (Single Sign On) login mechanism through SIMAk for special users for administrators and an authority to access SisKeu.

Table 2 SisKeu users' access authority.

No.	SisKeu Features	SisKeu Users			
		Ket	Ben	Dit	Div
A. SisKeu Application System					
1.	Login (authentication)	v	v	v	v
2.	Non-Financial Master Data			v^4	v^4
3.	Finance Master Data		v	v^2	v^2
B. Operational Budget Management Directorate					
1.	Budget Submission				v
2.	Budget Approval			v	
3.	Budget Disbursement Order		v		
4.	Budget Disbursement		v		
5.	Operational Budget Monitoring	v	v	v	v
6.	Institutional Bank Cash Monitoring	v	v	v^2	v^2
C. Study Program Accreditation Finance					
1.	Study Program Membership Registration		v	v^1v^2	v^1v^2

| No.	SisKeu Features	SisKeu Users			
		Ket	Ben	Dit	Div
2.	Payment of Study Program's Accreditation Fees		v	v^1v^2	v^1v^2
3.	Assessor Honor Payment		v	v^2	v^2
4.	Accreditation Financial Monitoring	v	v	v	v
D. Finance Report					
1.	Operational Financial Report	v	v		v
2.	Accredited Financial Report	v	v		v

SisKeu User Description:
Ket : General Chairperson of LAMDIK
Ben : Treasurer
Dit : Directorate
Div : Division

Special Notes for SisKeu:
v^1 : Directorate or Accreditation Division Authority
v^2 : Directorate or Division of Resources & Administration Authority
v^4 : Directorate or Division of IT & Data Authority

In connection with the LAMDIK operation, various financings were needed, especially for activities carried out by the functions and duties of the directorate. In order for the budget posts of each directorate to be organized, the operational budget submission process was carried out by the Divisions in the four directorates and must obtain approval from the respective Directorate officials. Afterwards, the submission from the directorate was used by the treasurer to make a disbursement order note.

The process of submitting the disbursement of the accreditation budget such as the honorarium of assessors and committees was carried out by the system. SisKeu received notifications from accreditation activities on SIMAk that had been completed when the payment process must be carried out. The budget proposal was then verified by an official of the Directorate of Accreditation and must be validated by an official of the Directorate of Resources & Administration for the treasurer making a memorandum of instruction for the disbursement of funds for the activity.
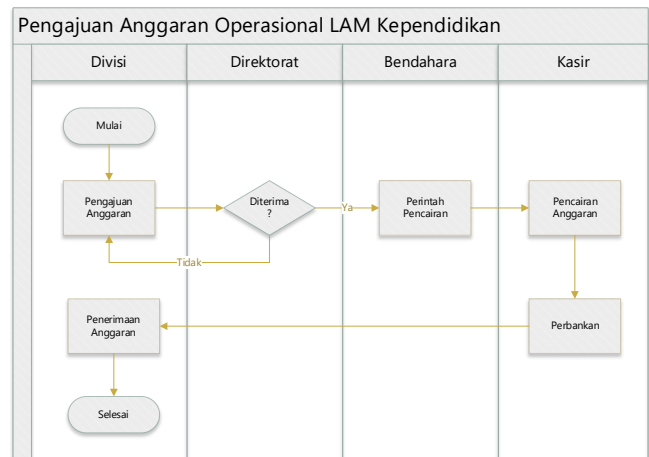
Figure 3 LAMDIK operational budget submission.

2.3.3. *Implementation and Unit Testing*

The results of the implementation stage were in the form of making computer program code according to the designs made at the design stage. Computer program testing focused on software logic and function to ensure that all parts were tested. This was conducted to minimize errors and ensured the results were as desired.

SIMAk and Siskeu programs and databases used https://siskeu.lamdik.or.id and the aspects tested were shown in Table 3.

Table 3 Unit testing SisKeu.

No.	Processes / Features
1.	User authentication
2.	User authorization, route, & role
3.	User switching
4.	Create model class
5.	Create view, form and user interface
6.	Create controller class
7.	Budget submission & approval
8.	Accreditation budget monitoring system
9.	Payment system

2.3.4. *Integration and System Testing*

The integration of SisKeu in SIMAK was very important because it ensured that the accreditation system in general run well and could be accounted. The testing also required accuracy because it involved processes on other systems. The aspects tested were listed in Table 4.

2.3.5. *Operational Maintenance*

The last was support. It was possible that the software would experience changes when used by users. Changes occurred due to the fact that errors that appeared and were not found during testing or the application must adapt to

LAMDIK's new policies or rules. In accordance with the waterfall chart, the type of change from this stage would determine what the next stage would be.

Table 4 SisKeu System Testing.

| No.	Processes / Features
1.	Multiple Database Connection
2.	Query Database SIMAk using Model
3.	Query Database SIMAk using class DB
4.	Login Token Request from SIMAK
5.	Single Sign On Authentication
6.	Generate report

3. RESULTS

This development research resulted in the design of a web-based information system for LAMDIK financial management, in which study program accreditation activities were held simultaneously. It took features for system users depending on the authority of the administrator. An example of a Chair in an executive position would certainly require summary information.
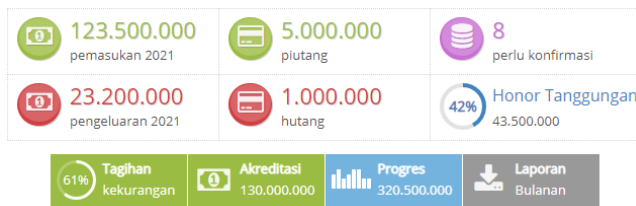
Figure 4 Accredited financial monitoring user interface prototype.

Figure 4 shows a prototype of the main display of SisKeu that provided a summary of financial conditions, including urgent matters carried out by the authorized management, such as making approvals, confirmation of finances, and so on.
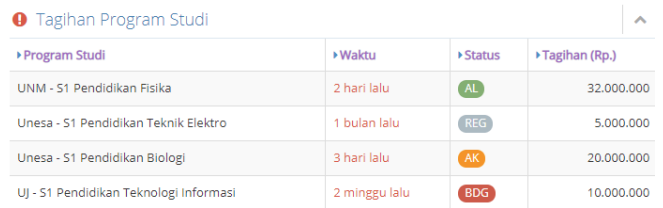
Figure 5 Study Program's Billing User Interface Prototype.

Figure 5 shows a prototype display list of notifications about bill payment at UPPS. This was related to the stages that must be experienced during the accreditation.

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