



# Data Management Information System for Accreditation at PGRI Silampari University Lubuklinggau South Sumatra

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**Abstract.** The purpose of this study, in general, was to find out SIM Data Accreditation of Study Programs (SIMBAK) at PGRI Silampari University, Lubuklinggau. This research used a systems approach with a spiral model from Boehm. Research results, the development of study program accreditation data systems, included; a) the development of a study program accreditation data system for study program administration (home, contact, criteria I, criteria II, criteria III, criteria IV, criteria V, criteria VI, criteria VII, criteria VIII, criteria IX, proposed data, data attachments, and supplementary data); b) the development of a study program accreditation data system for the assessor (home, contact, login, proposal data, attachments, supplements, suggestions and recommendations and then home display, contact, and logout). In conclusion, using the Spiral model from Boehm was feasible based on the results of research and discussion of SIM study program accreditation data.

**Keywords:** Data Management · Management Information System · Study Program Accreditation

## 1 Introduction

Internal problems that occur during the preparation of study program accreditation forms and changes in the external environment also increase the complexity of the work of the form writing team. BAN-PT, through a letter Number: 335/BANPT/LL/2017 dated January 26, 2017, announced that BAN-PT would implement an instrument-based Online Higher Education Accreditation System (SAPTO), which was started on June 1, 2017. Study programs are required to upload a softcopy of accreditation forms and supporting documents through SAPTO when applying for accreditation.

Utilization of technology in the form of the application of information system can help the accreditation process to be more automated. Technology is intended to facilitate human work so that the work can be done practically, quickly, and accurately. Information technology is able to access and display up-to-date information, such as Website-based information technology, which is a means to present information in the form of text

data, still or motion image data, animation data, sound, and video. According to Lee and Owens, success in web development is highly dependent on 1) creativity and developer capabilities, 2) bandwidth, and 3) hardware capabilities [1].

Designing a web requires creativity to create a web interface, menu components, color selection, and animation features [1]. The web view helps the user directly to get the required material. Likewise, based on the research results of Dubas et al. the most important part of the website is the design and content, making it easier to communicate [2]. Fast access capability so as not to experience errors in the download or upload process. Hardware capabilities (processor, ram, and hard disk) support the speed of obtaining information and avoid stagnation (hang) in accessing data.

Advances in website-based information technology can provide convenience for each individual or group to communicate. Long distance is not a major obstacle in communicating. Advances in website-based information technology can be utilized by higher education institutions in providing fast and precise service access to the management of accreditation databases for both study programs and institutions. The management of accreditation management information system can utilize website-based information technology. Information technology-based data management can be useful, simplify, and facilitate users in the process of uploading and downloading data, production, and editing [3–8].

There have been previous studies that have attempted to develop an information system for accreditation forms. Most of the previous research developed a partial accreditation form information system (only for certain standards, for example, standard 3 BAN-PT) and served only as a data center [9–18].

In addition, there has not been researched that has succeeded in developing an accreditation form information system that can simulate the final score obtained by a study program based on the data entered into the system. Then there has also been no development of an accreditation form information system based on nine standards. This is in accordance with the regulations of BAN-PT No. 2, 2019, namely; 1) vision, mission, and strategy, 2) governance, governance, and cooperation, 3) students, 4) human resources, 5) finance, facilities, and infrastructure, 6) education, 7) research, 8) community service, and 9) outcomes and achievements of tri dharma.

Based on these considerations, this study proposes an integrated study program accreditation form information system based on a website, a Study Program Accreditation Database Management Information System called SIMBAK, so that it can function as a data centre, capable of producing softcopy and hardcopy of study program accreditation forms, as well as acting as the final grade simulator obtained by a study program based on the form that has been compiled.

## 2 Methods

This research approach uses the System Development Life Cycle approach or better known as SDLC; a general methodology used to develop information systems. SDLC consists of several phases starting from the planning, analysis, design, development, testing, and implementation to system maintenance phases. The SDLC concept underlies various types of software development models to form a framework for planning and

controlling the manufacture of information systems. The SDLC model that will be used in this study is a spiral model. The spiral model, originally proposed by Boehm, is an evolutionary software process model that assembles the iterative nature of the prototype by means of control and systematic aspects of a linear sequential model [19]. Each cycle includes 1) communication with users, 2) planning, 3) risk analysis, 4) prototype or engineering, 5) construction, and 6) system evaluation. The stages can be explained as follows:

1. User Communication (liaison): Building communication between users and the needs desired by the user.
2. Planning: Defining resources, timeliness, and other project-related information.
3. Risk Analysis: Assessing management and technical risks.
4. Prototype or engineering: Building one or more representations of the application.
5. Construction, namely the tasks required to construct, test, install, and provide services to users.
6. Evaluation: To get feedback from customers [20].

### 3 Results and Discussion

Based on graphic design experts evaluating the menu design of the developed product, the validation results are carried out to see the feasibility of the design from the study program accreditation data menu. The results of the validation of graphic design experts were carried out on six indicators of study program accreditation data components, namely: 1) the feasibility of component design criteria I, 2) the feasibility of component design criteria II, 3) the feasibility of component design criteria III, 4) the feasibility of component design criteria IV, 5) the feasibility of component design criteria V, 6) the feasibility of component design criteria VI, 7) the feasibility of component design criteria VII, 8) the feasibility of component design criteria VIII, 9) the feasibility of component design criteria IX, 10) the design of proposed data components, 11) the component design appendix data, and 12) the component design of supplementary data. The following are the results of the validation of graphic design experts on the components of study program accreditation data.

Based on Table 1, the feasibility of the component design criteria I. Based on the validation results, the component design criteria I is feasible to use. Feasibility of component design criteria II. Based on the validation results, component design criteria II is feasible to be used. Feasibility of component design criteria III. Based on the validation results, component design criteria III is feasible to be used. Feasibility of component design criteria IV. Based on the results of the validation, component design criteria IV is feasible to be used. Feasibility of the design of the component criteria V Based on the validation results, the design of the component criteria V is feasible to be used. Feasibility of component design criteria VI. Based on the results of the validation, component design criteria VI is feasible to be used. Feasibility of component design criteria VII. Based on the results of the validation, component design criteria VII is feasible to be used. Feasibility of component design criteria VIII. Based on the validation results, component design criteria VIII are feasible to be used. Feasibility of component design criteria IX. Based on the validation results, the component design criteria IX are feasible

to be used. Feasibility of the proposed data component design. Based on the results of the validation of the proposed data component design, it is feasible to use. Feasibility of design component data attachment. Based on the results of the validation of the design of the attachment data component, it is feasible to use. Design feasibility of supplementary data components. Based on the results of expert validation of the supplement data component design, it is feasible to use.

In addition to the validation results from the indicators that have been described, graphic design experts also provide some suggestions or input for the goodness of the SIM design of the accreditation data developed. These inputs or suggestions are as follows:

1. Suggestion; the colour of the menu design should be more harmonious so that it is aligned and can be easily recognized by the user Repair; The colour of the menu design has been adjusted to the user's needs so that the user can easily operate the SIMBAK menu.
2. Suggestion: the submenu should be relevant to the needs of the menu that has been created Improvements: the submenu has been created based on the needs of the existing menu.
3. Suggestion: the display of all menu components and submenus along with the home page can attract users' attention Improvements: all menu and submenu design along with the homepage are made as attractive as possible, so they can attract the attention of users.

Based on the database expert evaluating the data implementation system for the developed study program accreditation, the results of the validation are carried out to

**Table 1.** Graphic Design Expert Validation Results

No	Design	Description	
		Feasible	Not
1	Component design criteria I	✓	
2	Component design criteria II	✓	
3	Component design criteria III	✓	
4	Component design criteria IV	✓	
5	Component design criteria V	✓	
6	Component design criteria VI	✓	
7	Component design criteria VII	✓	
8	Component design criteria VIII	✓	
9	Component design criteria IX	✓	
10	Proposed data component design	✓	
11	Appendix data component design	✓	
12	Supplementary data component design	✓	

see the feasibility of the study program accreditation data system. The database expert validation was carried out on two systems, namely the assessor admin accreditation data system, and the study program admin accreditation data system. The study program admin study program accreditation data system includes; 1) logging menu, 2) admin menu, 3) contact menu, 4) criteria I, 5) criteria II, 6) criteria III, 7) criteria IV, 8) criteria V, 9) criteria VI, 10) criteria VII, 11) criteria VIII, 12) criteria IX, 13) proposed data menu, 14) attachment data menu, 15) supplement data menu, 16) status, 17) home menu, and 18) logout. The explanation is as follows (Tabel 2):

1. Home menu. Based on expert validation, the home menu is feasible to use. The home menu is the initial display of SIMBAK, so admins can see various menus on SIMBAK.
2. Eligible logging menu integration. Based on the validation results, the logging menu is feasible to use. The logging menu is the initial stage for the study program admin to enter the study program accreditation data management information system through a username and password.
3. Feasibility of admin menu integration. Based on the validation results, the admin menu is feasible to use. The admin menu can create a study program admin and

**Table 2.** Results of database validation of study program administration menu integration.

No	Menu and Submenu	Description	
		Feasible	No
1	Menu logging	✓	
2	Administration menu	✓	
3	Menu Contact	✓	
4	Instrument Menu Criterion I	✓	
5	Criterion II Instrument Menu	✓	
6	Instrument Menu Criterion III	✓	
7	Instrument Menu Criterion IV	✓	
8	Instrument Menu Criterion V	✓	
9	Instrument Menu Criterion VI	✓	
10	Instrument Menu Criterion VII	✓	
11	Instrument Menu Criterion VIII	✓	
12	Instrument Menu Criterion IX	✓	
13	Proposed Data Menu	✓	
14	Menu Data Appendix	✓	
15	Supplementary Data Menu	✓	
16	Status Menu	✓	
17	Logout Menu	✓	
18	Menu Home	✓	

assessor username and password so that assessors and study program admins can enter the study program accreditation data management information system.

4. Feasibility of contact menu integration. Based on the validation results, the contact menu is feasible to use. The contact menu is used for admin assessors and study programs to gain access if there is an error or interference with SIMBAK.
5. The instrument menu for criteria I. Based on the results of expert validation, the instrument menu for criteria I is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments so that admins can upload criteria I instrument data in SIMBAK.
6. Menu instrument criteria II. Based on the results of expert validation, the criterion II instrument menu is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments so that admins can upload criteria II instrument data in SIMBAK.
7. Menu instrument criteria III. Based on the results of expert validation, the instrument menu criteria III is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments so that admins can upload criteria III instrument data in SIMBAK.
8. Menu instrument criteria IV. Based on the results of expert validation, the criteria IV instrument menu is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments, so admins can upload criteria IV instrument data in SIMBAK.
9. The instrument menu for criteria V. Based on the results of expert validation, the instrument menu for criteria V is feasible to use. The instrument form for criteria I includes; 1) study program code, 2) select submission data, and 3) upload attached data so that admins can upload criteria V instrument data in SIMBAK.
10. Menu instrument criteria VI. Based on the results of expert validation, the instrument menu of criteria VI is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments, so admins can upload criteria VI instrument data at SIMBAK.
11. Menu instrument criteria VII. Based on the results of expert validation, the instrument menu of criteria VII is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments so that admins can upload criteria VII instrument data at SIMBAK.
12. Menu instrument criteria VIII. Based on the results of expert validation, the instrument menu of criteria VIII is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments so that admins can upload criteria VIII instrument data in SIMBAK.
13. Menu instrument criteria IX. Based on the results of expert validation, the instrument menu criteria IX is feasible to use. The instrument form for criteria I include; 1) study program code, 2) select submission data, and 3) upload data attachments so that admins can upload data for instrument criteria IX in SIMBAK.
14. Proposal data menu. Based on the results of expert validation, the proposed data menu is feasible to use. The proposed data form consists of; 1) study program code, 2) select attachment data, 3) LLDIKTI recommendation letter number, and 3) upload instrument proposals, so admins can upload proposed data on SIMBAK.

15. Attachment data menu. Based on the results of expert validation, the attached data menu is feasible to use. The attached data form consists of; 1) study program code, 2) select attachment data, 3) upload instrument proposals, so admins can upload attached data in SIMBAK.
16. Supplementary data menu. Based on the results of expert validation, the supplement data menu is feasible to use. The supplement data form consists of; 1) study program code, 2) select attachment data, 3) upload instrument proposals, so admins can upload supplementary data on SIMBAK.
17. Status menu. Based on the results of expert validation, the status menu is feasible to use. So that the admin can see the status of the accreditation data on SIMBAK.
18. Eligible logout menu integration. Based on the validation results, the logout menu is feasible to use. The logout menu is the final stage for the study program admin to exit the study program accreditation data management information system.

Meanwhile, the integration of the study program accreditation database system for the assessor admin includes; 1) home menu, 2) contact menu, 3) logging menu, 4) proposal data menu, 5) attachment data menu, 6) supplement data menu, 7) suggestion and recommendation menu, 8) admin menu, and 9) logout menu. The explanation of the results of the database expert validation can be seen in the following Table 3.

Based on Table 3, eligibility of the home menu. Based on expert validation, the home menu is feasible to use. The home menu is the initial display of SIMBAK, so staff can see various menus on SIMBAK. Eligible logging menu integration. Based on the validation results, the logging menu is feasible to use. The logging menu is the initial stage for admins to enter the study program accreditation data management information system through a username and password. Feasibility of admin menu integration. Based on the validation results, the admin menu is feasible to use. The admin menu can create a study program admin and assessor username and password so that assessors and study program admins can enter the study program accreditation data management information system. Feasibility of contact menu integration. Based on the validation results, the contact menu

**Table 3.** Results of Expert validation of study program administration menu integration

No	Menu and Submenu	Description	
		Feasible	No
1	Menu Home	✓	
2	Menu Contact	✓	
3	Menu Logging	✓	
4	Proposed Data Menu	✓	
5	Menu Data Attachment	✓	
6	Supplementary Data Menu	✓	
7	Suggestions and Recommendations Menu	✓	
8	Logout Menu	✓	
9	Admin Menu	✓	

is feasible to use. The contact menu is used for admins and study programs to get access if there is an error or interference with SIMBAK.

Feasibility of the proposed data menu. Based on the results of expert validation, the proposed data menu is feasible to use. The proposed data form consists of; 1) study program code, 2) select attachment data, 3) LLDIKTI recommendation letter number, and 3) upload instrument proposals, so admins can upload proposed data on SIMBAK. Feasibility of the attachment data menu. Based on the results of expert validation, the attached data menu is feasible to use. The attached data form consists of; 1) study program code, 2) select data attachment criteria 1-IX, and 3) upload instrument proposal, so the admin can upload attached data in SIMBAK.

Feasibility of the supplement data menu. Based on the results of expert validation, the supplement data menu is feasible to use. The supplement data form consists of; 1) study program code, 2) select attachment data, 3) upload instrument proposals, so admins can upload supplementary data on SIMBAK. Eligibility menu suggestions and recommendations. Based on the results of expert validation, the menu of suggestions recommendations is feasible to use. The suggestion and recommendation form consist of; 1) assessor code, 2) assignment letter number, 3) select message status, 4) LLDIKTI recommendation letter number, and 5) upload instrument proposal. So that the admin can upload suggestions and recommendations on SIMBAK. Eligibility Menu logout. Based on the validation results, the logout menu is feasible to use. The logout menu is the final stage for the admin to exit the study program accreditation data management information system.

In addition to the validation results from the indicators that have been described, database experts also provide some suggestions or input for the good of the SIMBAK developed. These inputs or suggestions are as follows:

1. Suggestion; integration of menus and submenus should be made not to complicate study program admins and assessors. Repair; The integration of menus and submenus can make it easier for study program admins and assessors.
2. Suggestion: try to input, process, and output data without experiencing interference or errors. Improvements: input, process, and output data are anticipated for server hangs and so on.

The one-to-one evaluation was carried out on six study program operators with high, medium, and low abilities. At this stage, the evaluation is carried out to obtain information about the ease of managing the SIM, study program accreditation data, and product attractiveness. The steps taken in the one-to-one evaluation are as follows; 1) operator staff is welcome to enter the system with the given password and username, 2) operator staff identify SIMBAK menus and submenus, 3) operator staff perform (input, process, and output) SIMBAK. If the operator is able to operate SIMBAK, then SIMBAK makes it easier and more attractive for users to manage study program accreditation data.

The results of the one-to-one validation of the SIMBAK model were carried out on three indicators, namely; 1) product attractiveness, 2) product content readability, and 3) product updates. After being evaluated, the operator felt interested and familiar with using SIMBAK. The operator understands the use of navigation buttons. This shows the advanced SIMBAK model. The level of legibility of menus and submenus is also



very good. They understand how to input, process and output. The results of the system development stage can produce a product that can be used for small group trials.

At the system development stage, there are two admins in managing SIMBAK, namely the study program admin and assessor. However, the management of the study program accreditation database at the system development stage still uses manuals. It is necessary to develop an online-based SIM model for study program accreditation data, so that study program operators can input study program accreditation data easily and then send the data online to the server.

The development of a study program accreditation data management system consists of managing study program assessor admin data and managing study program admin accreditation data management. Study program operators input and upload study program accreditation data and then send it to the server so that the data is stored in the study program accreditation data management information system.

The study program accreditation database is very important to be stored on the server because the database is a place to store data. Database or commonly referred to as the database, consists of 2 words, namely base, and data. The base can more or less be interpreted as a headquarters or warehouse, a nesting/gathering place. At the same time, data is a representation of real-world facts that represent an object, such as humans (employees, students, buyers, customers), goods, animals, events, concepts, circumstances, and so on, which are recorded in the form of numbers, letters, symbols, text, images, sound, or a combination thereof [21].

The database itself can be defined as a collection of interconnected files. However, the database is not just a collection of files. Records in each file must be linked to records in other files. The main principle of the database is the organization of data or archives. At the same time, the main goal is the ease and speed of retrieval of data/archives [22].

The database system has several important elements, namely: the database as the core of the database system, software to manage the database, hardware to support data processing operations, and humans who have an important role in the system. The database system elements and sub-elements are presented in the Table 4.

The database system will support the effectiveness and efficiency of the management information system of an organization that uses it. Its effectiveness can be seen from the data compiled and stored in the database system files properly and correctly (valid). The

**Table 4.** Elements and Sub Elements of Database System

No	Database System Elements	Database System Sub Elements
1	<i>Database</i>	The main element consists of data
2	<i>Software</i>	Consists of two kinds: Database Management System, DBMS, and Database Application Software, DBAS.
3	<i>Hardware</i>	Main sub-elements: 1) Central Processing Unit, CPU consists of arithmetic & logic unit, ALU; Main Memory, MU; Control Unit, CU and 2) Storage Unit, SU
4	<i>Brain ware</i> (human being)	Humans are an important element in the database system.

software used has been tested for reliability (accurate and correct) so that the database system is able to provide great support to the information system.

Its efficiency can be seen from the database system designed and built for various user needs, easy to use, can be used separately or jointly by users, and minimize data duplication, Redundancy, data is easy to modify, can be expanded both volume and structure.

A database management system (DBMS) is a software that manages, executes database queries and editing data (input, remove) [23]. Database management system (DBMS) consists of software that operates the database and provides storage, access, security, backup, and other facilities [24]. Database management systems can be categorized based on: supported data model, such as “relational database” or XML, supported computer type, such as “server cluster” or “mobile phone,” language for accessing databases, such as SQL or Xquery, the appearance of “trade-off” such as “maximum scale or “maximum speed” or others. Some DBMSs cover more than categories, i.e., supported multiple access languages as is done on DBMS MySQL, PostgreSQL, Microsoft Access, SQL Server, FileMaker, Oracle, RDBMS, dBASE, Clipper, FoxPro, and so on.

## 4 Conclusion

The development of the study program accreditation data system includes; a) development of a study program accreditation data system for study program admins (home, contact, criteria I, criteria II, criteria III, criteria IV, criteria V, criteria VI, criteria VII, criteria VIII, criteria IX, proposed data, data attachments, and supplement data), b) development of a study program accreditation data system for assessor admins (home, contact, login, proposal data, attachments, supplements, suggestions and recommendations and then display home, contact, and logout).

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