



SMART-A: Smart Application for Education

Accreditation Database

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Abstract. Currently, universities are competing to strengthen internal quality assurance. One of them is through quality assurance study programs in each tertiary institution. This study aims to develop Smart-A, an application used to prepare accreditation forms for the Indonesian Language and Literature Education Study Program at the State University of Surabaya. This research uses the software development method by Pressman, which is divided into four stages, namely (1) analysis, (2) design, (3) coding, and (4) testing. In addition, researchers added the next stage, namely maintenance. There are two results of this study. First, the article in this study is still in the SMART-A application design category, which enters two stages: (1) the needs analysis stage and (2) the application design stage. Second, some needs analysis stages for SMART-A application development are the application system description, application model analysis, and application model drafting. At the application design stage, it uses functional, usability, readability, performance, and maintainability criteria.

Keywords: SMART-A Application, Analysis, Design, Coding, Testing.

1 Introduction

SMART-A application goes through the analysis, design, coding, testing, and maintenance process. The existence and functioning of quality assurance in higher education is currently very urgent [1], [2], [3]. Higher education, as a printer of academic generations, requires quality assurance to ensure quality in learning. Quality assurance in tertiary institutions cannot be separated from various elements, starting from officials in tertiary institutions, lecturers, students, staff, and stakeholders [4], [5]. In this context, higher education aims to strengthen culture, democracy, decent work, and good quality assurance [6]. If all goes well, universities will also produce good output. For this reason, every tertiary institution is expected to carry out quality assurance through internal and external audits, better known as accreditation.

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In Indonesia, universities are also competing to improve quality assurance through study program accreditation or higher education accreditation [7], [8], [9]. Study program accreditation is accreditation carried out at the study program level. This accreditation focuses more on each study program's area of expertise. For example, *Lamdik*, an accreditation related to the field of education; *Lamkes*, a study program accreditation related to health study programs; *Lamemba*, a study program accreditation on business management and accounting. The study program accreditation agency has specifications in the field of study program accreditation. The implementing agency selects the assessors from the study program accreditation agency by considering the eligibility criteria and the assessor's expertise. The BAN-PT has a function for accredited universities. However, when study programs do not yet have an independent accreditation body, BAN-PT accredits the study programs.

Universities in Indonesia are currently trying to optimize quality assurance in study programs, faculties, and universities. Universities are trying to monitor optimally so that accreditation results are as expected [10], [11]. It was done with the hope that accreditation could be optimal and get an A/superior grade. However, not all study programs in tertiary institutions can optimize the quality assurance system at the study program, faculty, and university levels. It was caused by human resources that were not optimal, funding that was not optimal, and management systems that were not optimal. With regard to higher education accreditation, according to Permendikbud No. 50 of 2014, "Higher Education Quality Assurance system is a systemic activity to improve the quality of higher education in a planned and sustainable manner".

About tertiary education quality assurance, in Law Number 12 of 2012 concerning Higher Education Article 53, The Higher Education Quality Assurance System, as referred to in Article 51 paragraph (2), consists of an internal quality assurance system developed by Tertiary Education Institutions; and an external quality assurance system through accreditation. In connection with the phenomenon of accreditation trends, this study raises the topic of Smart-A application, which aims to facilitate the preparation of accreditation forms and strengthen study program quality management. This research is focused on designing Smart-A as an application that facilitates the preparation of accreditation forms and optimizes the quality assurance of the Indonesian Language and Literature Education Study Program and the Indonesian Literature Study Program.

Research related to the design/composition of accreditation systems/applications is as follows. First, a web-based accreditation application [12], [13], [14], [15], [16]. Second, accreditation assessment [17], [18], [19], [20]. Third, accreditation is related to implementation/practice [21]. Research on accreditation is interesting since it relates to quality assurance of study programs, faculty quality, and university quality. Research on accreditation cannot be separated from the fact that aspects of human resources, funding, and education management are good. Better human resources, funding, and management will also produce good accreditation.

2 Methods

This study adapted the software development method developed by Pressman [22]. The term adaptation in this method indicates that this study does not fully use the model from Pressman. Researchers use several Pressman concepts that are considered relevant and in accordance with the application design stages compiled by researchers. The application development model that adapts to Pressman refers to four stages. First, software requirement analysis is a process for representing information, needs analysis, functions, and behavior that can be translated into data, architecture, interfaces, and components. Second, software design focuses on four areas, namely (a) data structures, (b) software architecture, (c) interfaces, and (d) algorithms. Third, code generation, the stages of product creation. This activity is a coding activity and testing errors in the code. The next step is to start testing after the code has been written.

The testing process focuses on the software's internal logic to ensure all functions have been tested. The external function testing is carried out to find invisible errors and ensure that inputs can be processed and produce results according to requirements. The stages raised Pressman are still added by one more stage by the researcher, namely the maintenance stage. This stage is the final stage of designing this application since maintenance is related to the feasibility of the application or complaints related to the features of the application. For example, if an error occurs or is not to the client's wishes.

If it is described, the flow of this research development is visualized as follows.

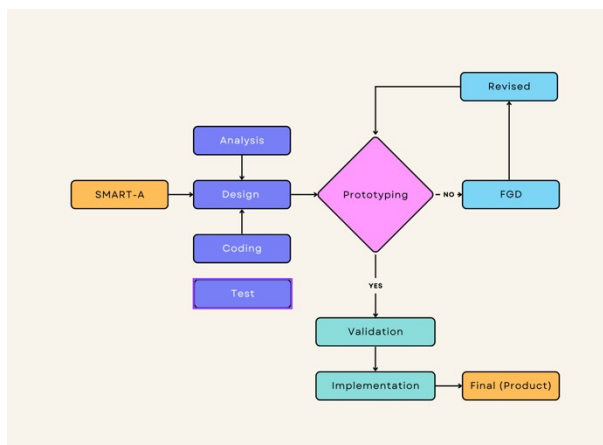


Fig. 1. Research flow.

For the SMART-A application to be tested, the researchers conducted a Focus Group Discussion (FGD) to obtain technical input on language, substance, and aspects of application design. Thus, it is hoped that the application developed can be more optimal. In addition, researchers also carry out internal and external validation so that the results of application development get input from the authorities [23].

3 Results and Discussion

At the time of writing this article, the research was still at the stage of developing the first and second stages of the SMART-A application. The researcher performs the following activities in the software requirement analysis stage.

The first is the analysis of software requirements. At this stage, the researcher analyzed software. It needs to be related to applications that could help facilitate the archiving and data collection of study program documents used for accreditation. In that case, the research team created a needs analysis table for the software. The needs analysis is made in general and consulted by the programmer. In the next stage, the researcher developed a needs analysis table that will be used for the SMART-A application domain.

Table 1. SMART-A application features.

Lecturer					
No.	Category	Title/Name	Scale		
			International	National	Regional
1.	Research				
2.	PKM				
3.	Article				
4.	Intellectual Property Rights (HAKI)				
5.	Book				
6.	Achievement				

Student					
No.	Category	Title/Name	Scale		
			International	National	Regional
1.	Achievement				
2.	Intellectual Property Rights (HAKI)				

Office staff					
No.	Category	Title/Name	Scale		
			International	National	Regional
1.	Training				

The designed domain is designed in a smart rapid system (SRS). Thus, the features created by programmers are expected to be simple, practical, and accessible. Therefore, users of the application, namely lecturers, students, and office staff, can easily operate the SMART-A application. Lecturers, students, and office staff can access and upload data for complete accreditation in the application. The features made by programmers are made friendly, making it easier for users. If it is visualized, the first stage appears in the following figure.

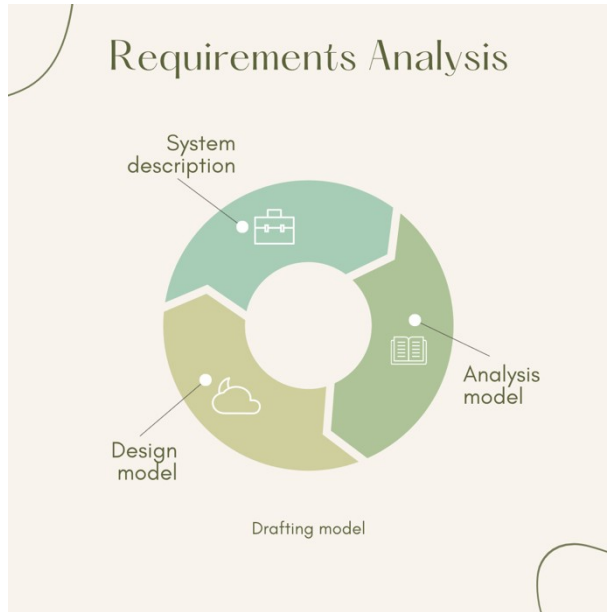


Fig. 2. Requirements analysis.

The second is application design. The application design model designed for SMART-A includes architecture, interface, component level, and deployment representation, which are the main work products generated during software development. In this stage, the SMART-A application design must: (a) meet the needs/desires of application users, which is related to the ease of documenting accreditation data; (b) be readable, which means it has a good readability level so that users can easily understand the features contained in the SMART-A application design; (c) be able to provide complete information so that users do not experience misinterpretation in using the application; (d) use standard language that is requested by the client/user. Therefore, bilingual or other features that make it easier for users can be utilized for language features. Application design content must meet the functionality, usability, readability, appearance, and maintenance criteria. If it is visualized, the SMART-A application design criteria appear in the following presentation.

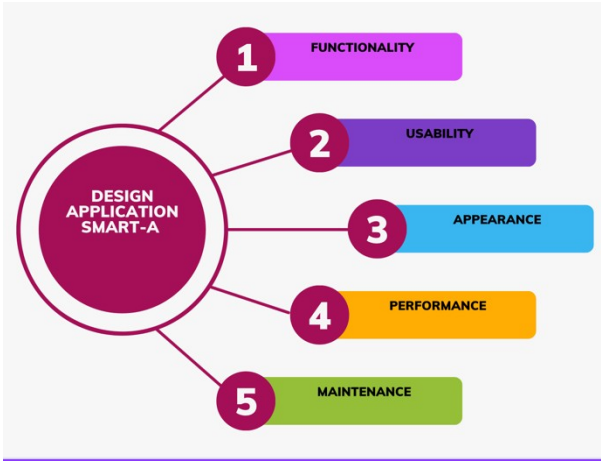


Fig. 3. SMART-A application design criteria.

As for the SMART-A application dashboard, it is made to be simple and smart. It indicates two things, namely (a) applications related to the Indonesian Language and Literature Education Study Program as well as Indonesian Literature and (b) the State University of Surabaya. The following is the display of SMART-A application dashboard.

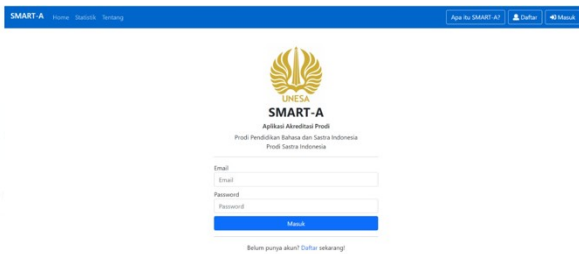


Fig. 4. SMART-A application design dashboard.

At the design stage, researchers consult with programmers to avoid misunderstandings in designing applications. Apart from that, the researchers also asked for a draft of an alternative SMART-A application design. Thus, the application design draft is not just one, but there are three alternatives that researchers can choose. The most representative design will be selected and determined by the research team. Then, that design will be used for the SMART-A application.

4 Conclusion

To summarize, Pressman’s four stages of software development - analysis, design, coding, and testing - have been effectively employed to develop the Smart-A

application. This application facilitates the preparation of accreditation forms for the Indonesian Language and Literature Education Study Program at the State University of Surabaya. Furthermore, the researchers incorporated another stage into this study, specifically maintenance. The article falls under the genre of SMART-A application design, which consists of two stages: (1) the needs analysis stage and (2) the application design stage. Furthermore, during the needs analysis stage for the development of the SMART-A application, specific tasks are undertaken, including the description of the application system, analysis of the application model, and drafting of the application model. During the application design stage, it is essential to consider many factors, such as functional requirements, usability, readability, performance, and maintainability.

Authors' Contributions

Anas Ahmadi drafted and finalized the article manuscript. Parmin designed the introductory part of the article. Resdianto Permata Raharjo designed the article's literature review section. Fafi Inayatillah designed the methods section. Andik Yulianto designed the analysis and conclusion of the article. Arie Yuanita edited the article and bibliography. Ilmatus Sa'diyah proofread and translated the article. Ahmad Burhanuddin edited the article according to the template.

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