

Design and Build a Quality Assurance Document Archiving Application Using the Rapid Application Development

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ABSTRACT

Higher Education quality assurance is a planned and sustainable process in systematically improving the quality of Higher Education. One of the functions of quality assurance for tertiary institutions is for accreditation activities, in study programs accreditation preparation is an activity that often requires time, energy and the minds of the academic community. The problem that often arises in quality assurance activities is that supporting data and information that are required for completeness have not been well documented. As time goes by, there are more and more documents and the search for documents is getting longer, because you have to open documents in every folder where these documents are not small. The purpose of this research is to overcome some of the problems that arise, including good archive management, documents can be grouped by year or criteria and time efficiency in recapitulating all quality assurance documents. The method used in the development of this system is the Rapid Application Development method, which enables faster system development. Document Archiving Information System for Website-Based Quality Assurance in Informatics Engineering Study Program, University of PGRI Madiun, was created using the Laravel framework, while databases used MySQL. The tools used in the process of making this system are XAMPP for the database server, Visual Studio Code for the text editor. In system testing using black box testing which only tests software functionality, the test shows valid results and no errors or bugs occur.

Keywords: Document Archiving; Laravel; Quality Assurance; RAD; Website

1. INTRODUCTION

Higher Education quality assurance is a planned and sustainable process in systematically improving the quality of Higher Education. Based on Law no. 12 of 2012 concerning Higher Education, the Higher Education quality assurance system is divided into two categories, namely internal quality assurance developed by the Higher Education institutions themselves and external quality assurance carried out through the accreditation process. In the accreditation process, study programs or tertiary institutions are evaluated to determine feasibility and quality values in administering educational programs (Hastriyandi et al., 2021). This is done to ensure that educational programs organized by tertiary institutions are of adequate quality and can provide optimal benefits for students and the community.

One of the functions of quality assurance for tertiary institutions is for accreditation activities, in study programs accreditation preparation is an activity that often requires time, effort and the minds of the academic community (Ekawijana & Wisnuadhi, 2022). The problem that often arises in quality assurance activities is that supporting data and information that are required for completeness have not been well documented. As time goes by, there are more and more documents and the search for documents is getting longer, because you have to open documents in every folder, these documents are not small. Quality assurance often becomes tiring work due to the scattering of all supporting document evidence, so good document management is needed to facilitate the preparation of quality assurance supporting documents (Ekawijana & Wisnuadhi, 2022).

PGRI Madiun University is a private tertiary institution under the auspices of the PT PGRI Madiun Educational Institution Trustees Association (PPLP) foundation in Madiun City. Universitas PGRI Madiun or often called UNIPMA has 24 study programs, one of which is the Informatics Engineering study program. In the Informatics Engineering study program, quality assurance document archives are still not neatly organized and are still stored on Google Drive, completed documents are sometimes forgotten to put them away, so when needed they have to open piles of files again and sorting them out one by one takes time and effort.

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Therefore, a system database is needed to accommodate many of these documents and are grouped by year, and can be digital archives that can be easily searched and retrieved at any time, so as to save time and effort.

2. LITERATURE REVIEW

Document Archiving

According to Kusuma & Aryati (2019:141) archiving is a series of activities and processes which include the creation, receipt, collection, arrangement, maintenance, and storage of files according to a predetermined system. As information technology develops, document management has shifted from the traditional way of using physical forms such as paper to digital forms (Muhajirin and Wijiharta 2022:9).

Quality assurance

In the accreditation process, study programs or tertiary institutions are evaluated to determine the value of eligibility and quality in administering educational programs (Hastriyandi et al., 2021). This is done to ensure that educational programs organized by tertiary institutions are of adequate quality and can provide optimal benefits for students and society in general.

Website

According to (Rizki and Ferico 2021:2) a website is a means of conveying digital information in the form of web pages that are connected to each other using links inserted in text or images. The same thing was also conveyed by Asmara (2019:3) websites are all web pages that are in the domain and contain information. To create a good website, it is necessary to fulfill certain criteria in the aspects of functionality, design, content, originality, professionalism and effectiveness (Bekti, 2015).

MySQL

MySQL is a type of open source database. In building an application or website that is complex and can function dynamically, the database is very important and must be used to store various data in the form of information. According to Sianipar (2015:1) MySQL is a database system that uses a client-server architecture, with central control on the server. The server functions as a program capable of processing the database.

According to Prahasti et al. (2022:155) MySQL is software that is a DBMS (Database Management System) which is Open Source. MySQL is a database management system that uses a relational approach. By using this approach, the data in the database will be stored in several tables, this allows data processing to be done more effectively and quickly (Novendri et al., 2019:48).

According to Priyadi (2014) the database consists of several tables that can be related or not. Each table represents a place to store information that supports database functions in a system. Websites and mobile applications also require a database server to store a lot of information. For example, username, password, user information, and so on. MySQL can manage all types of databases.

Information Systems

An information system is a system that is implemented by an organization to meet the needs of transaction management every day which acts as a managerial operation within the organization and also has strategic activities to obtain reports needed by external parties (Wijaya et al., 2022:77).

RAD (Rapid Application Development)

According to Hidayat & Hati (2021:9) Rapid Application Development (RAD) is a procedure for linear sequential software development to shorten the development cycle in a short period of time. RAD aims to reduce system development time that is usually required in the traditional system development life cycle, from design to implementation of the system being built. Ultimately, RAD also strives to meet rapidly changing business needs.

UML (Unified Modeling Language)

The Unified Modeling Language (UML) is a conceptual model that is generally used for designing logical models in information systems (Vo & Hoang, 2020:1). The same thing was conveyed by Syarif & Nugraha (2020:65) UML is a visual language used as modeling and related relationships in a system by applying diagrams and supporting texts.

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The main building blocks in UML are diagrams, there are some detailed diagrams (types of timing diagrams) and some are general in nature. UML (Unified Modeling Language) is a modeling language used for object-oriented systems or software.

Black Box Testing

According to Setiyani (2019:21) Black box testing is testing the quality of software that is only on the functionality of the software. The purpose of black box testing is to find inappropriate functions, interface errors, data structure errors, performance errors, initialization errors and termination. This test is carried out at the end of software development, in order to find out that the software that has been built can work properly and accordingly, in addition to knowing whether the functions, input, and output of the software are in accordance with the planning at the initial stage.

3. METHOD

In the development method of the Web-Based Quality Assurance Document Archiving Information System Design using the R.A.D (Rapid Application Development) method. The RAD method is an approach to software development that uses multilevel techniques. This model emphasizes short, brief, and fast development cycles. Limited time is an important limitation in implementing this RAD model.

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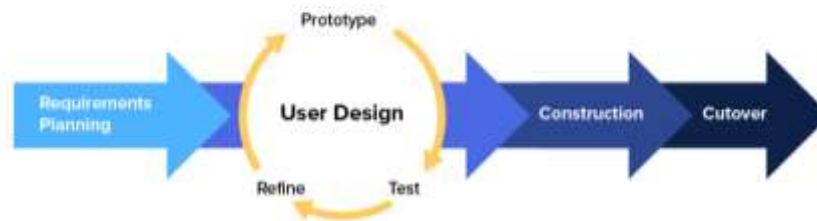


Fig. 1 Rapid Application Development Method Flow
Source : Hidayat & Hati (2021)

In the RAD development method, there are 4 stages that must be carried out in developing a website system. The four stages are as follows:

1. Needs Planning
This stage is the initial stage of developing a system, which at this stage identifies problems and collects data from various sources of information, namely observation, needs analysis, and interviews with informants from Informatics Engineering Study Program Lecturers. After that, determine planning needs.
2. Make Design and Prototype
At this stage the design process and design revisions are carried out, which are carried out repeatedly if the design is still not in accordance with the user needs that have been identified in the previous stage. This stage carries out the design of the system design to be built, such as compiling flowcharts, ERD, use case diagrams, and designing the interface of the web system, which is in accordance with the data obtained. Then create a prototype system.
3. System Development Process
At this stage, start the process of compiling and writing HTML, CSS, PHP coding scripts. By using the XAMPP web server, and compiling a MySQL database that will be used as a place to store system data for this website. Then, transforming the prototype into a beta and final version of the website application.
4. System Implementation and Testing

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This stage includes optimizing for application stability, implementing the system into hosting, to testing and compiling documentation. The last stage carried out is testing using blackbox testing which tests the entire system based on the functionality of the system to reduce any bugs or errors in the system that has been built.

4. RESULT

Needs Planning

Analysis of the old system was carried out by observation and interviews in the research room of the Informatics Engineering Study Program, Universitas PGRI Madiun. Observations were made by analyzing the current quality assurance document filing system. The system method used previously was in the form of a manual system, it is still not neatly organized and is still stored on Google Drive, documents that have been completed sometimes forget to put them in, so when needed they have to open the pile of files again and sort them one by one so that it takes up time and effort.

From the analysis obtained, the development of a new system aims to simplify the method of filing quality assurance documents more efficiently and simply. This system is in the form of an online website that is always active and can be accessed by all Lecturers, PMPS, Secretaries of Study Programs and Heads of Study Programs within the Informatics Engineering study program. The online website aims to allow users to access it at any time. This system will do an automatic recap based on the year and criteria specified by the user.

Make Design and Prototype

In this stage the researcher uses the UML (Unified Modeling Language) modeling method including use case diagrams, activity diagrams, sequence diagrams, class diagrams and database design according to the data that has been obtained. The use case diagram in this study has 4 actors, 5 cases and 1 include. The activity diagram in this study has 4 actors, including the Head of Study Program has 4 activities, the Secretary of Study Program has 5 activities, the PMPS has 4 activities and the Lecturer has 2 activities. The sequence diagram in this study has 4 actors, including the Head of Study Program has 4 activities, the Secretary of Study Program has 5 activities, the PMPS has 4 activities and the Lecturer has 2 activities. The class diagram in this study consists of 3 classes, including document class, category class and user class. The document class has 8 attributes and 4 methods, the category class has 5 attributes and 4 methods, the user class has 9 attributes and 4 methods. The database design in this study contained 3 tables, including document tables, category tables and user tables. The document table has 8 entities, the category table has 5 entities and the user table has 9 entities.

The users table has several entities, including id as the primary key, name, username, email, password, level, avatar, created_at and updated_at. As can be seen in Table 1.

Table 1 Users Table

Entity Name	Data Type	Length	Description
id	bigint	20	Primary Key
name	varchar	100	
username	varchar	50	
email	varchar	50	
password	varchar	100	
level	varchar	5	
avatar	varchar	100	
created_at	timestamp		
updated_at	timestamp		

The documents table has several entities, including id as the primary key, year, category_id as the foreign key from the category table, file, user_id as the foreign key from the user table, description, created_at and updated_at. As can be seen in Table 2.

Table 2 Documents Table

Entity Name	Data Type	Length	Description
id	bigint	20	Primary Key
year	year	4	

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category_id	bigint	20	Foreign Key
file	varchar	100	
user_id	bigint	20	Foreign Key
url_link	varchar	100	
created_at	timestamp		
updated_at	timestamp		

The categories table has several entities, including id as the primary key, criteria, sub_criteria, created_at, updated_at. As can be seen in Table 3.

Table 3 Categories Table

Entity Name	Data Type	Length	Description
id	bigint	20	Primary Key
criteria	varchar	50	
sub_criteria	varchar	200	
created_at	timestamp		
updated_at	timestamp		

DISCUSSIONS

Interface Design

The following is the design of the login interface:



Fig. 2 Login Interface Design

The following is the dashboard interface design:



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Fig. 3 Dashboard Interface Design

Implementation

In this study the authors used the Laravel framework for system development and used the MySQL database. The following is how the login page looks for all user levels:



Fig. 4 Login Page Display

The following shows the dashboard page:



Fig. 5 Dashboard Page Display

The following is a recap of the quality assurance documents in pdf form, in which there are names of documents and links to supporting documents which can be in the form of files that are already in the form of links or related links.

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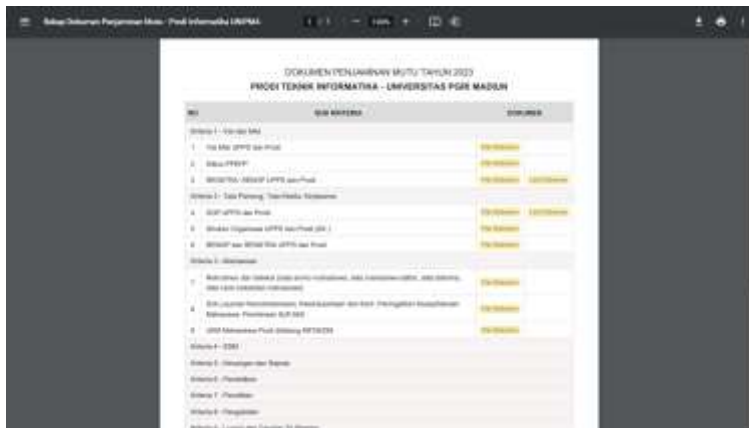


Fig. 6 Document Summary Page View

Testing All Users

Table 4 Testing All Users

User Level	Description
Secretary of Study Program	Valid
Head of Study Program	Valid
Study Program Quality Assurance	Valid
Lecturer	Valid

The results of black box testing show that the information system for archiving quality assurance documents for Informatics study programs does not experience system errors or bugs. All answers display valid results.

5. CONCLUSION

Based on the results and discussion, the writer can conclude, the method used to design a Web-Based Quality Assurance Document Archiving Information System is R.A.D and was built using the Laravel framework and several programming languages, namely: HTML, PHP, CSS, and Javascript while the database uses MySQL. The system was built to facilitate the process of filing quality assurance documents. Grouped into 9 criteria and 90 sub criteria making it easier for the document search process, equipped with filter and search features, besides that it is used for digital archives which can be recapitulated by year and criteria. The test results of the Web-Based Quality Assurance Document Archiving Information System using the blackbox method show that there are no error/bug results from the system that has been built and from the test results table it is explained that the information obtained produces a Valid value. After completing the research which is still very simple and far from perfect, the authors provide suggestions including, There needs to be more perfect development so that the system can function more efficiently and according to what is needed. The features that have been made can be further developed so that the appearance of the user interface and its usability is more optimal and easy to use. The website that has been created can be developed by combining the existing management information system (MIS).

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