



Web-Based Library Information System Using Rapid Application Development (RAD) Method at Qamarul Huda University

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Submitted: 19/03/2022; Accepted: 30/03/2022; Published: 31/03/2022

Abstract–The library is an important part of higher education, where the teaching and learning process does not escape from teaching materials and reference materials. Qamarul Huda Badaruddin University is one of the universities in NTB which has a library with a desktop-based library system. This has an impact on the management of libraries and users which in this case students become ineffective and inefficient. With a high need for libraries, library managers, namely librarians and students as users, need a web-based information system so that they can be used from anywhere and anytime, simply using a smartphone or computer. To answer the above problems, the authors design and build a web-based library information system at Qamarul Huda Badaruddin University using the Rapid Application Development (RAD) method. The framework uses CodeIgniter which allows developers to create web applications with Rapid Application Development (RAD) development characteristics. The Qamarul Huda Badaruddin University Library Information System consists of 12 functional requirements, which cover all the requirements for the Qamarul Huda Badaruddin University library. Completion of each module also refers to all stages of the Rapid Application Development (RAD) method and all of them can run well.

Keywords: Library Information System; Rapid Application Development (RAD); CodeIgniter Framework; Web; Qamarul Huda University

1. INTRODUCTION

Information and communication technology become an important role in a process in all fields, one of which is in the field of education [1]. Higher education is one of the institutions in the field of education that should take advantage of the role of information and communication technology, including libraries in universities.

In every university, the existence of a library is very much needed considering the teaching and learning process carried out by lecturers and students, requires teaching materials and references. The library is a room that contains a collection of books neatly arranged based on certain book groups [2].

Qamarul Huda University or abbreviated UNIQHBA is one of the universities located in Lombok. The library in this university still uses desktop-based applications and only on the side of the librarian or librarian, there is no system used by students yet. This is very ineffective for students and librarians where students have to come in person if they want to see book collections and other processes. Therefore, we need an information system that can provide book information, the process of borrowing books to borrowing reports that can be accessed online using a smartphone or computer [3]. With advances in technology, information can be conveyed more efficiently and effectively. The impact of other technological advances is that it makes it easier for users to get and process information. This method is very efficient for its users, because in a short time users can obtain and process accurate data and information whenever and wherever they are [4].

The Library Information System is a combination of information technology and human activities that utilize technology itself as operational support for management in data and information processing [5]. A web-based library information system will make data management more organized and in accordance with the wishes of users [6]. A web-based library information system can also facilitate the admin or librarian in managing library data at any time [7]. Besides that, it also makes it easier for students as library users who can search for books, read books and even download e-books using their respective smartphones or laptops.

Information systems can run well if supported by work procedures, human resources and good hardware and the selection of the right programming language [8]. To support library information systems, the Rapid Application Development (RAD) method is used which aims to shorten the time normally required in the traditional systems development life cycle between the design and implementation of information systems [9]. The RAD method is one of the methods used to develop software. This method is able to reduce the time to develop software [10].

With a web-based library information system using the Rapid Application Development (RAD) method, the above problems are resolved. For the framework, the CodeIgniter framework is used called Model - View-Controller or abbreviated as MVC. MVC separates programming logic from presentation. This can be seen from the minimization of presentation scripts (HTML, CSS, JavaScript, and so on) which are separated from PHP (Hypertext Preprocessor) scripts [11].

Several studies regarding system development and the application of the Rapid Application Development (RAD) method that have been carried out include, among others, a research study conducted [12] on the Development of Software

Size Estimation Application using Function Point Analysis (FPA) Approach with Rapid Application Development (RAD). to build an application that can be used to estimate software size with the Function Point Analysis (FPA) method that can be used by software developers with Rapid Application Development (RAD) as a system development method. Research studies conducted [13] on the analysis study of the Rapid Application Development model in the development of information systems. This study aims to analyze the development of information systems with RAD stages in order to produce a good and quality information system that can be used by users. Research studies conducted [14] on improving service quality through CRM with the RAD method. This study uses the RAD method for the CRM system development process to be faster and in accordance with the needs of business actors. Research studies conducted [15] on online sales information systems (e-commerce) using wordpress cms at Toko Soraya shop by applying the RAD method. Another research is [16], with the development of a library information system at Dharmawangsa University, the problems that arise can be reduced to a minimum, especially in the database system for every transaction made. With the development of web-based applications (web-based application development) facilitates the installation process and in further system development. Research [17] develops and analyzes the quality of a web-based school library information system, the method used is research and development, the waterfall development method.

2. RESEARCH METHODOLOGY

2.1 Literature Study

Study of literature related to library information systems, Rapid Application Development (RAD), PHP, codeigniter framework, and other matters related to the object of research

2.2 Field Study

Conduct field studies for data collection for further analysis.

2.3 Observation

Conduct direct and detailed observations of activities in the library of Qamarul Huda University. After the observation is complete, there are 3 phases in the construction of a library information system, namely:

- Planning Phase. Where this phase brings together analysts and users to identify the purpose of the system to be built. this phase is oriented towards solving problems that exist in the library of the Qamarul Huda University.
- Rapid Application Development (RAD) Design Phase. Where is the phase that forms the RAD design between the analyst and programmer to design the system to be built.
- Construction Phase. Where this phase executes in the form of making program scripts and is a continuation of the Rapid Application Development (RAD) Design Phase
- Implementation Phase. Where in this phase the analyst works with users intensively during the workshop, and designs some aspects and non-technical needed [2].

3. RESULT AND DISCUSSION

3.1. Activity Diagram

- Activity Diagram Visitor Guestbook Pages

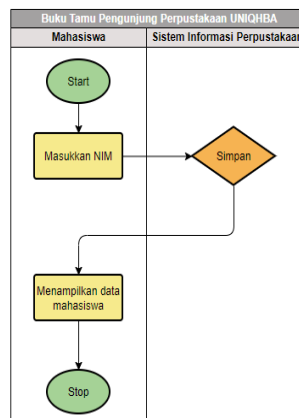


Figure 1. Activity Diagram Visitor Guestbook Pages

In Figure 1 it can be seen that to fill out the UNIQHBA library visitor's guest book, students only input their NIM. Then the library information system will read the NIM and display student data such as the name and study program.

b. Activity Diagram Book Data Input

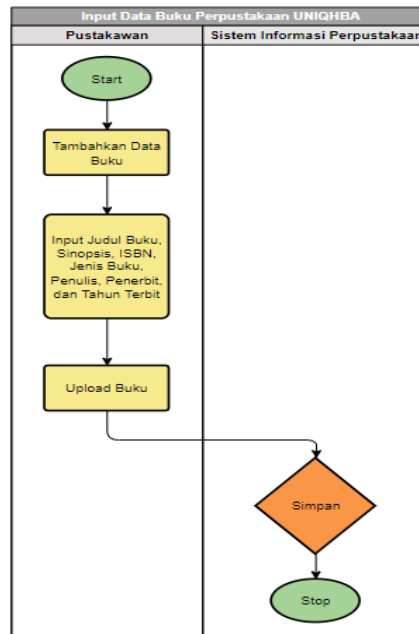


Figure 2. Activity Diagram Book Data Input

In Figure 2, the librarian inputs book data by adding book data and then entering the book title, synopsis, ISBN, type of book, author, publisher and year of publication. After that, the librarian uploads the book and stores it in the library information system.

c. Activity Diagram Input Data E-Book

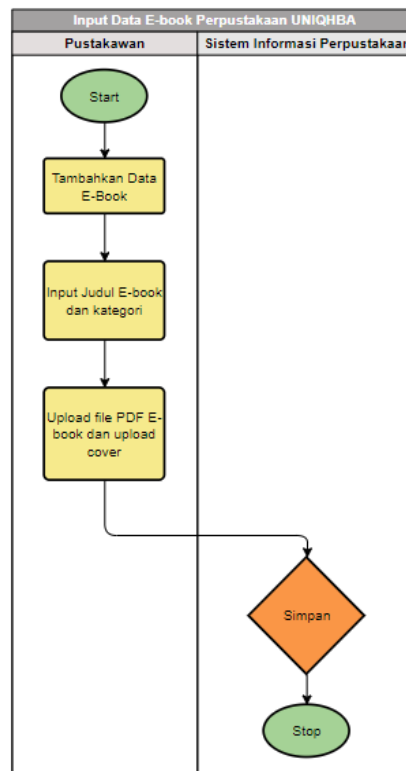


Figure 3. Activity Diagram Input Data E-Book

In Figure 3 it can be seen that in inputting e-book data in the library information system, the first step is for the librarian to add e-book data then input the title and category. After that, upload the PDF e-book file and its cover, then save it in the library information system.

d. Book Search Activity Diagram

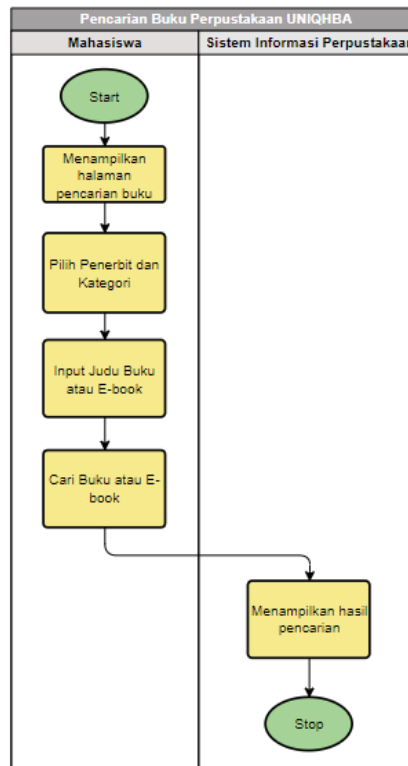


Figure 4. Book Search Activity Diagram

Figure 4 shows the flow in the book search. The first step is to choose a publisher and category, then input the title of the book or e-book. After that search for books or e-books.

e. Activity Diagram of Book Borrowing Transactions

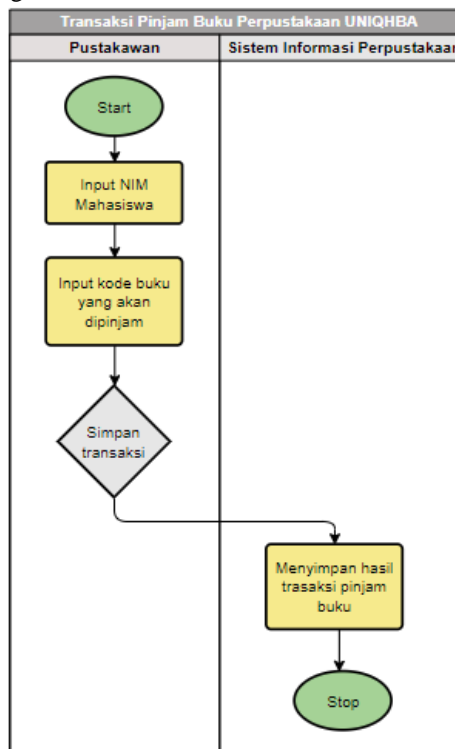


Figure 5. Activity Diagram of Book Borrowing Transactions

Figure 5 shows the flow of book lending transactions, where the librarian first inputs the student ID number, then inputs the code for the book to be borrowed, then saves the transaction.

3.2 Screen Display

a. Guset Book Page

On the visitor's guest book page, it is enough for each student to fill in their respective NIM as shown in Figure 6.



Figure 6. Guset Book Page

b. View Registered in Guestbook

After filling in the NIM, the library information system will display the profile of the NIM, namely the name and study program as shown in Figure 7.



Figure 7. View Registered in Guestbook

c. Book Data Input Page

On this page, the librarian inputs book data from the title, synopsis to uploading the book cover, as shown in Figure 8.

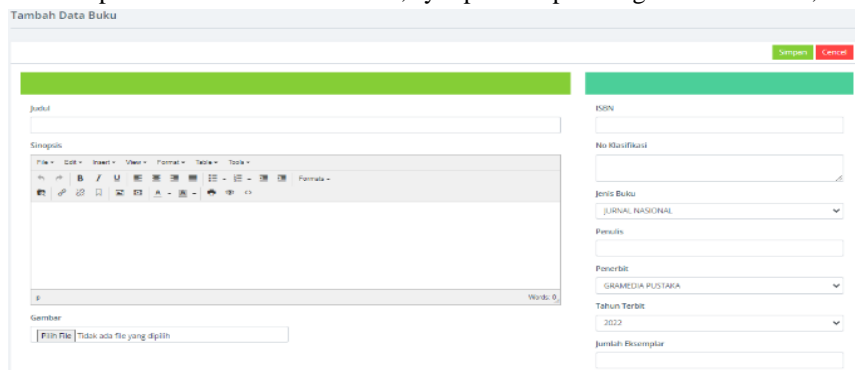


Figure 8. Book Data Input Page

d. Book Collection List Page

This page displays the entire book data that has been inputted by the librarian. As shown in Figure 9.

No	Cover	ISBN	No Klasifikasi	Judul	Penulis	Jumlah	Action
1		9794485373	617 SME k	Keperawatan Medikal-Bedah Brunner dan Suddarth : Buku Ajar Ed.8. Vol. 1	Smeltzer, Suzanne C	9 Eksemplar	
2		9789797565725	610.280 7 ERY S	Statistik Rumah Sakit untuk Pengambilan Keputusan	Ery Rustyanto	9 Eksemplar	

Figure 9. Book Collection List Page

e. E-book Data Input Page

On this page, the librarian inputs e-book data such as titles, categories and uploads e-book files and covers. This page is shown in Figure 10.

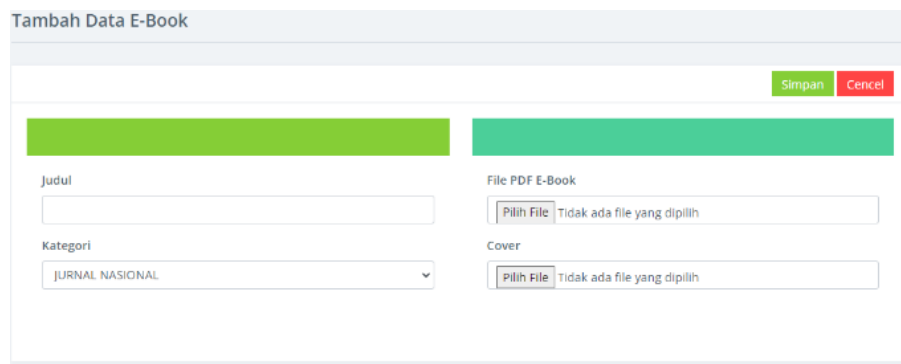
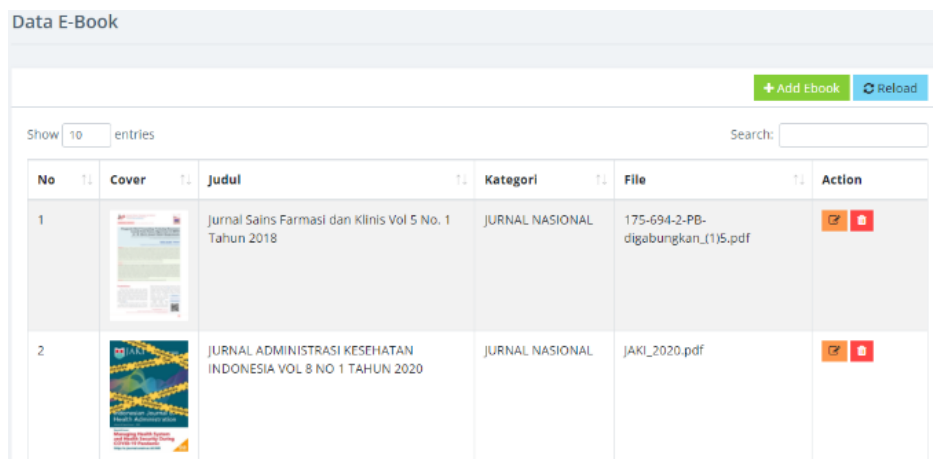


Figure 10. E-book Data Input Page

f. E-book Collection List Page

This page displays the entire e-book data that has been inputted by the librarian, as shown in Figure 11.







No	Cover	Judul	Kategori	File	Action
1		Jurnal Sains Farmasi dan Klinis Vol 5 No. 1 Tahun 2018	JURNAL NASIONAL	175-694-2-PB-digabungkan_115.pdf	
2		JURNAL ADMINISTRASI KESEHATAN INDONESIA VOL 8 NO 1 TAHUN 2020	JURNAL NASIONAL	JAKI_2020.pdf	

Figure 11. E-book Collection List Page

g. Book Search Page

This page is used by students to find the desired book. Students can fill in publishers, categories or can simply write in the field of the book as shown in Figure 12.

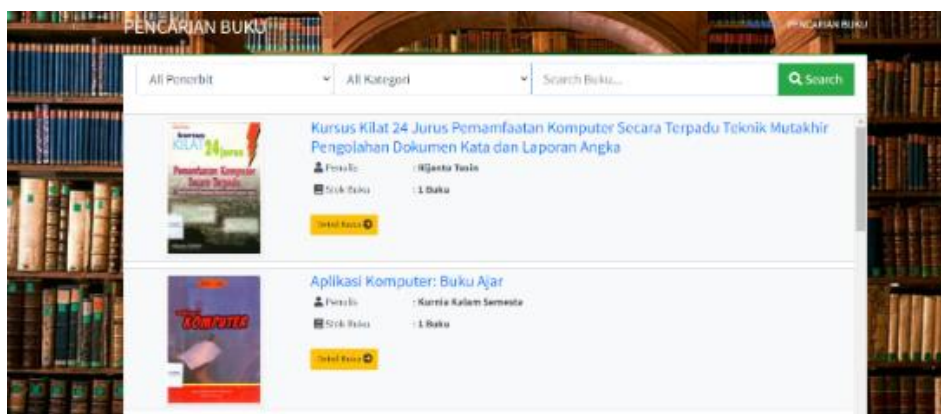


Figure 12. Book Search Page

h. Page of Book Borrowing Transactions

This page displays the entire book borrowing transaction made by each student. This view is shown in Figure 13.

Figure 13. Page of Book Borrowing Transactions

i. Book Loan Report Page

On this page, the librarian can see an overall report related to book lending, starting from the title of the book borrowed in a certain period, the name of the borrower to the fine if any. This page is shown in Figure 14.

No	Tanggal	Buku	Penerbit	Jumlah	terlambat	Denda	Status
1	22 Jan 2022 S/D 28 Jan 2022	Ekstrinsikalitas Sastra Indonesia	Rajawali Pers	1 Buku	23 Hari	Rp.46.000	Dipinjam
2	22 Jan 2022 S/D 28 Jan 2022	Pengantar Apresiasi Karya Sastra	Sinar Baru Algesindo	1 Buku	23 Hari	Rp.46.000	Dipinjam
3	22 Jan 2022 S/D 28 Jan 2022	Teori Apresiasi Sastra	Pustaka Pelajar	1 Buku	23 Hari	Rp.46.000	Dipinjam
4	17 Jan 2022 S/D 23 Jan 2022	Metode Penelitian Sastra : Analisis Psikologi	Muhammadiyah University Press	1 Buku	28 Hari	Rp.56.000	Dipinjam
5	17 Jan 2022 S/D 23 Jan 2022	Kritik Sastra Feminis : Teori dan Aplikasinya	GRAMEDIA PUSTAKA	1 Buku	28 Hari	Rp.56.000	Dipinjam

Figure 14. Book Loan Report Page

4. CONCLUSION

The conclusion from the development of a library information system at Qamarul Huda University is that by using the Rapid Application Development (RAD) method, the process of building a web-based library information system is faster and also has quality in meeting the needs of users, namely students. The Rapid Application Development (RAD) method makes boundaries so that the system that is built does not come out of the needs of students and librarians as librarian. Completion of each module also refers to all stages of the Rapid Application Development (RAD) method and all of them can run well. The Qamarul Huda University Library Information System consists of 12 functional requirements, namely librarian login, librarian logout, librarian register, visitor data, student data (name, NIM, study program), book search, book data management, e-book data management, transaction management book borrowing, fines data management, search for book lending transactions, and book lending reports.

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