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Web-Based Library Information System Design
(Study at Pasundan 7 Junior High School, Bandung)

ABSTRACT

School libraries generally aim to provide information services on borrowing and returning books to students and teachers. The library of Pasundan 7 Bandung Junior High School has a large collection of books, both in the form of textbooks, collections of questions, magazines and newspapers. However, this library has not been well managed because all activities still use manual methods and do not have good documentation. This can be seen from the way students experience difficulties when looking for the desired book, then the process of recording borrowing and returning books that are still manual so that it takes a long time and the data storage is not guaranteed, the number of scattered records that confuse officers when matching data to make reports, because it is only stored in the form of ordinary archives that are easily lost. Therefore, a web-based library information system is needed at Pasundan 7 Bandung Junior High School. The Library Information System of SMP Pasundan 7 Bandung aims to assist library staff in minimizing service time with the help of computerized transactions, especially in book loan and return transactions. In designing an information system, all data related to the library is stored in a file warehouse called a database. To produce a good and correct database, it is necessary to carry out system design stages. The goal is to produce good data input. This Final Project discusses the design of creating a web-based information system, which can assist library staff in the process of delivering library information at Pasundan 7 Bandung Junior High School. This research focuses on designing a library information system in a school environment. The purpose of this research is to change the pattern of conventional services into computerization to facilitate data management in book borrowing and returning transactions in preventing data loss. The research method used is descriptive analysis method, which is a research method that tries to describe the object or subject under study objectively, and aims to describe the facts systematically and the characteristics of the object and the frequency studied precisely. Information system design is built using the waterfall method. Or through sequential stages in the hope of producing a design that is in accordance with the existing target needs. Data collection methods by means of interviews and direct observation. The results showed that using a computerized system is much more effective than the conventional way and even more efficient. The effectiveness of implementing a web-based Library Information System at Pasundan 7 Bandung Junior High School can be seen from the service process carried out.

Keywords: library, library information system, library service process

INTRODUCTION

Over time, science and information technology domains have consistently seen substantial advancements. Computers have substantially influenced diverse facets of human existence, encompassing personal, collective, corporate, commercial, recreational, educational, and healthcare domains. The developments above have significantly influenced society, illustrating the indispensability of information technology as a fundamental requirement in contemporary existence.

Libraries play a crucial role in providing a valuable repository of reference materials for students, university scholars, and the wider public, facilitating access to knowledge. In order to enhance one's knowledge and obtain information, individuals can engage in reading or borrowing books from the library, thus obviating the necessity of making a purchase. Hence, there is a necessity for developing an information system that can efficiently and precisely access all essential services, specifically those pertaining to the borrowing and returning of books in the given context.

SMP Pasundan 7 Bandung is an educational institution situated in Jalan Cijerah Gg. Pelita No. 11, in the neighborhood of Cijerah, Bandung Kulon sub-district, within Bandung. At the SMP Pasundan 7 Bandung library, data processing, including member data, book records, borrowing records, and return records, is currently conducted using conventional methods. This involves manually recording the information in categorized books based on the specific type of transaction, such as book borrowing transactions, book return transactions, and other record-keeping books. Many archival record-keeping books are available, occasionally resulting in duplicate entries. An additional concern pertains to the manual handling of duties such as book search, inquiry, borrowing, and returning by library users. This reliance on staff intervention can lead to complications, resulting in an inconvenient, impractical, and time-consuming service procedure. Moreover, in fulfilling the school principal's request for reports, the staff encounters a significant delay due to manually aggregating various datasets, including member information, book data, borrowing records, return records, and fines.

Borrowing and returning books in a progressively elongated line frequently result in librarians needing help maintaining accurate records. Occasionally, this poses a challenge when aggregating data to generate reports. In the absence of a structured system, the persistence of this state poses a substantial threat of book loss. Another potential outcome is that the reputation of the service may decline, regardless of the completeness of the book collection. This could lead to members becoming more inclined to seek references or information from alternative sources.

Based on the abovementioned problem, the author expresses an interest in undertaking a research endeavor entitled "Designing a Web-Based Library Information System at SMP Pasundan 7 Bandung."

METHOD

In conducting this study, obtaining data as a primary source is necessary to compose and analyze the issues that will be addressed in the subsequent chapters. In order to accomplish this objective, the study methodology employed is outlined as follows:

The chosen method for composing written works.

1. Collection of Data and Information
   In order to collect data and information, we employed a systematic procedure of conducting a comprehensive search in libraries, exploring a variety of pertinent sources, and leveraging online resources. The chosen methodology for data collection encompasses the following:

a. It is recommended to perform a literature study before data analysis. This review will serve as a basis for discussion and offer the writer valuable insights into the range of activities and concepts employed in the writing process.

b. In order to support analytical and synthetic debates, it is essential to have access to reference resources that have been utilized as guides. The data above have the potential to be expanded upon and utilized as the fundamental basis for formulating solutions and deriving conclusions within the context of written work.

2. Literature Review The process of library research, also known as a literature review, entails gathering theoretical information about the subject under investigation. The data utilized in this study is derived from scholarly publications and books accessible within the library. These sources serve as the theoretical underpinning for the research.
3. Survey of the Current System
   During this phase, primary research is undertaken. The research methodology employed involves systematically observing the company's physical facilities and conducting interviews with pertinent stakeholders to gather insights into the existing system.
4. Field study, often known as field research, is a methodological approach employed in academic research.
   The research is undertaken by directly examining the firm under investigation, aiming to acquire more precise information and data and gain a firsthand understanding of the company's circumstances. In this particular field study, two distinct methodologies are utilized:

a) Observation refers to the systematic collection of data through direct visits to relevant parties inside the company to gather information on information systems and membership. This includes obtaining the appropriate documents and identifying the required control measures.

b) Interviews are a data collection method that entails directly interacting with pertinent individuals to obtain the required information.

System Development Method

The author of this Thesis employed the SDLC (System Development Life Cycle) as the system development method for developing the system. The Unified Software Development Process (USDP) is a framework incorporated in the Software Development

Life Cycle (SDLC) architecture. The USDP framework is characterized by its component-based architecture, wherein the program under development is partitioned into discrete components interconnected via interfaces. The USDP framework utilizes the Unified Modeling Language (UML) as a tool for software modeling throughout the development process. The Unified Modeling Language (UML) model methodology encompasses non-proprietary specifications. It offers comprehensive elucidations of requirements facilitating visualization, construction, and development of software systems based on objects.

In the context of this particular system, several phases of work are undertaken by system analysts and programmers during the development process of information systems. These stages can be outlined as follows:

Systems Development Engineering

The SDLC paradigm additionally facilitates the explicit assignment of roles and duties to developers, designers, business requirement analysts, and project managers. A further characteristic of the Systems Development Life Cycle (SDLC) is its capacity to comprehensively represent the input and output processes as they transition from one planning phase to the subsequent one. The author has outlined the following procedures for constructing a system:

1. The first step in the process is planning.
   The preliminary phase of system development involves acquiring a comprehensive comprehension of user requirements, encompassing the identification, diagnosis, and characterization of problems.
2. The present discourse aims to engage in a comprehensive analysis of the subject matter at hand.
   During this phase, the primary objective is identifying and choosing the most optimal problem-solving alternatives to advance with a well-structured system.
3. Design Phase During this stage, comprehensive problem-solving alternatives are developed to systematically construct a novel system, focusing on ensuring user-friendliness.
4. The concept of development refers to the process of growth and progress in several aspects of society, including economic, social, and political dimensions. This entails generating optimal and suitable options for problem-solving.
5. The topic of interest pertains to the process of testing.
   During this phase, the system undergoes testing to evaluate its capabilities.
6. The system implementation process refers to the stage in which a new system is put into operation within an organization. This involves the installation, configuration, and testing of the system

   The concluding phase includes the assessment of the efficacy and efficacy of the newly implemented system, together with the ongoing maintenance and evaluation of the implemented system.

RESULTS AND DISCUSSION

The steps involved in system implementation.

The system implementation process encompasses the execution of the system implementation plan, the completion of system implementation activities, and the subsequent monitoring and evaluation of the implemented system. During the system implementation phase, the activities encompass transferring the program logic that has been designed into the selected programming language, conducting tests on the data, and finding any faults or shortcomings in the program.

The process of hardware deployment refers to the implementation and installation of physical computing devices within a given system or network.

The hardware specs that are mandatory for the system are outlined below, with a specified minimum requirement:

Table 1. Hardware Specifications

No	Hardware	Specifications
1	**Monitor**	**LCD 14”**
2	***Processor***	**Intel(core i3) 2,6 Ghz**
3	***Hardisk***	**500 Gb**
4	***Keyboard***	***Onboard***
5	**VGA**	***Onboard system***
6	**RAM *(Memory)***	**4 Gb**
7	**Mouse**	**Standar**

Application of Software

Table 2. Software Specifications

No	*Software*	Minimum Req	Maksimum Req
1	**Operating System**	**Windows 7**	**Windows 10**
2	**Browser**	**Mozila Firefox**	**Google Chrome**
3	***Office***	**Office 2007**	**Office 2010**
4	***DBMS***	***XAMPP* Versi 3.2.2 (PHP 7,2)**	***XAMPP* Versi 3.2.2 (PHP 7,2)**
5	***Visual studio code***	***2***	***3***
6	**Acrobat reader**	**free**	**free**

Implementation of a web-based library information system

1. Main page.

   This page is the initial display when the application starts running.

Figure 1. Main Display Login

2. Dashboard View

   This page is the page after the user does Login, there are some statistics or small table menu to describe the entire information system managed by this Library Information System.

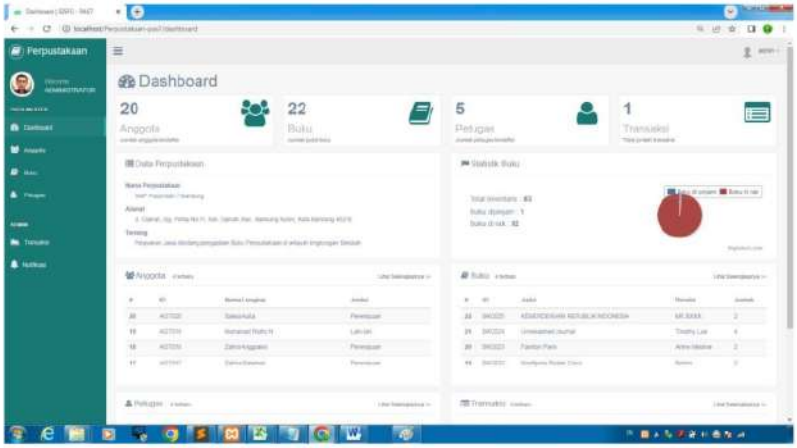

Figure 2. Dashboard page display

3. Display of Book Loan Transactions

This page was created to carry out Book Loan Transactions carried out by

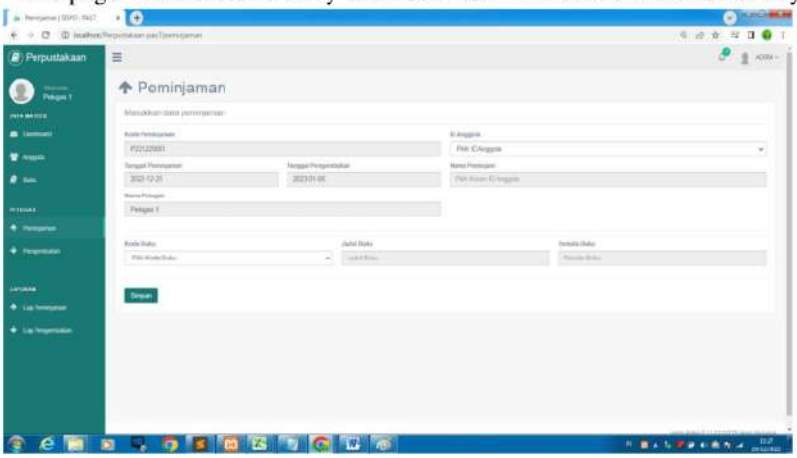

Figure 3. Book loan transaction display

4. Book Return View

This page is a book return transaction form which is operated by library staff.

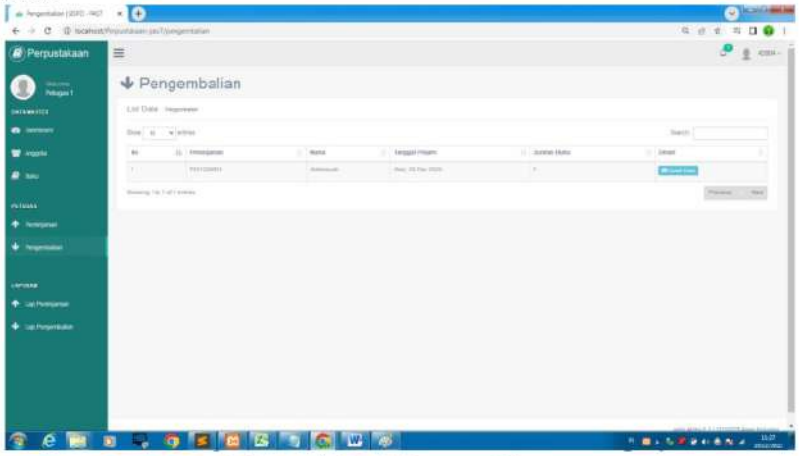

Figure 4. Book Return View

5. Notification Display

This page is used by Administrators to create notifications addressed to library staff who are currently operating.

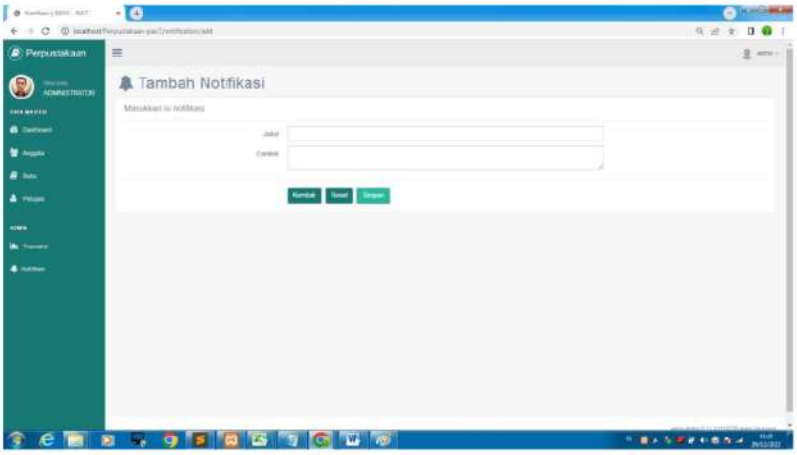

Figure 5. Notification display

System Testing

The system testing carried out by the author, namely Black Box Testing, is a trial of the system that has been built.

Testing the Admin System and Officers

The author tested the system using Black Box Testing on admin users as administrators and officers as system operations. And the result is as follows:

Table 3. Login System Testing

No.	Tested function	Testing Scenarios	Expected results	Test result
1.	*Login*	Open the start of the application	The system will display the Login page request input Enter username and password with informative running text decoration	Succeed
2.	*Login*	Fill in the wrong username then press the login button	The system provides input error notification and still displays the Login page	Succeed
3.	Login Admin	Fill in the admin username	The system will unlock Admin Dashboard with menus: a. Dashboards b. Member c. Book d. Officer e. Transaction f. Notifications	Succeed
4.	Officer Login	Fill in the officer's username	The system will unlock Officer Dashboard with menu display as following: a. Dashboards b. Member c. Book d. Borrowing	Succeed

			e. Return f. Loan Report g. Return Report	

Table 4. System Testing on Admin User Logins

No.	Tested function	Testing Scenarios	Expected results	Test result
1.	*Dashboard*	Clicking the Dashboard icon	Will display statistical data	Succeed
2.	*Member*	Clicking on the member icon	Will display the Library Members table in the right area of the screen with the sidebar menu still on the left.	Succeed
3.	Book	Clicking on the book icon	The library book table will display in the right area of the screen with the sidebar menu still on the left.	Succeed
4.	Officer	Clicking on the officer icon	Will display the Officer Data Table which is equipped with Edit and Delete buttons	Succeed
5.	Edit	Clicking the edit icon	Will display the Edit Officer form on the right area of the screen with several function buttons such as (Change Password, Back, Reset, and save)	Succeed
6.	Transaction	Clicking the Transaction icon	It will only display the loan table and return table below it in the right area of the screen.	Succeed

7.	Notifications	Clicking the notification icon	Will display a post notification notification display and is equipped with an add notification button to add new notifications	Succeed

Table 5. System Testing on Officer User Login

No.	Tested function	Testing Scenarios	Expected results	Test result
1.	*Dashboard*	Clicking the Dashboard icon	Will display statistical data	Succeed
2.	*Member*	Clicking on the member icon	The library member table will display in the right area of the screen with the sidebar menu still on the left.	Succeed
3.	Book	Clicking on the book icon	Will display the library books table in the area right side of the screen with the sidebar menu still on the left.	Succeed
4.	Borrowing	Clicking the loan icon	A loan transaction form will display equipped with a green Save button in the right screen area	Succeed
5.	Return	Clicking the return icon	It will display a table on the right and if there is data, a blue button will appear on each row with detailed data writing, the button will display a form to execute book return data.	Succeed
6.	Report	Clicking the Wipe icon.	Will display a borrowing table in the	Succeed

		lending lending	right area of the screen equipped with an export file button (Excel, PDF, Print)	
7.	Return Report	Clicking the Wipe icon. return	Will display the Returns table in the right area of the screen which is equipped with an export file button (Excel, PDF, Print)	Succeed

Table 6. System Testing on Logout

No.	Tested function	Testing Scenarios	Expected results	Test result
1.	*Logout*	Clicking the Logout icon	The system will return to Login	Succeed
2.	*Notifications*	Clicking the notification icon	Will open the message delivered by Administrator	Succeed

The conclusion of the test above, it can be concluded that the author has succeeded in realizing the information system expected by the library at SMP Pasundan 7 Bandung.

And then the application will enter the development stage according to the level of field needs.

CONCLUSION

Based on the comprehensive examination of the research processes involved in the development of a web-based library information system at SMP Pasundan 7 Bandung, as previously elucidated and deliberated about in the preceding sections, the ensuing conclusions can be drawn:

The development process employed the Software Development Life Cycle (SDLC) methodology, which involved a sequential progression through various design stages, including planning, analysis, design, implementation, testing, and system management. The developed system can efficiently and effectively handle member registrations, loan transactions, and book returns, thereby obviating the necessity for sizeable paper-based record-keeping that may result in data loss.

The web-based library information system underwent black box testing to assess the functionality of several buttons that generate appropriate categories for usage in the web-based library information system at SMP Pasundan 7 Bandung.

The selection of features is derived from the issues identified in the SWOT analysis. The system offers several supporting features, such as conducting loan and return book operations, generating loan reports, and producing return reports. These features are directly derived from the recorded data within the system.

In the future, the library website administrators will be able to efficiently oversee the number of members and the overall count of books accessible within the library.

Based on the given prompt, it is recommended that the following suggestions be considered.

The following guidelines are provided to ensure the efficient operation of the constructed information system: The implementation of book numbering is recommended to enhance searching efficiency. It is imperative to offer specialized training to staff members or administrators responsible for operating the Library Information System. In order to mitigate the risk of data loss, it is imperative to implement a routine maintenance strategy.

REFERENSI

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