Enhancing Library Management: Development of Shelving and Weeding Applications for Performance Tracking at UNESA Library

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Abstract. Libraries with numerous activities strive to provide the most accurate information to both library management and users. Additionally, every library staff member's work should be recorded accurately. This study is motivated by the need to facilitate librarians and library staff in creating activity reports, work records, and accountability for each task performed at the University Library Center (UPT) of the State University of Surabaya (UNESA), particularly in shelving (a routine library activity where processed and used materials are re-shelved according to their classification number) and weeding (the removal of books that are no longer in use from the collection). This system ensures that these activities are recorded neatly and identifies who performed them. Therefore, designing a performance recording application can help achieve more accurate reporting of shelving and weeding activities conducted by the UPT Library of UNESA.

Keywords: Website-based Application, work record application, activities, automation, recording.

1 Introduction

The development of information technology in libraries has rapidly progressed. Information technology is extensively utilized in library services to facilitate easy access to library collections for patrons. However, for library staff engaged in daily activities, documenting their work can be challenging.

One of the tasks performed by library personnel includes shelving and weeding library materials. Shelving is a routine task where processed library materials used by patrons are reorganized on shelves according to their classification numbers. Recording these activities is particularly difficult. Weeding involves removing books from the collection that are deemed unfit for further use upon inspection.

With advancements in information technology, it is hoped that the shelving and weeding activities in libraries can be efficiently recorded using an application. This application should allow library staff to download necessary reports on their activities as needed.

Information systems in the context of libraries are systems that integrate information technology, business procedures, people, and data to generate, process, store, and disseminate necessary information [1]. Their aim is to provide accurate, relevant, and

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timely information to support decision-making at various organizational levels [2] [3]. The development of information systems involves steps from planning to maintenance [4], encompassing not only technology but also the role of humans in using and interacting with information.

Libraries, as facilities offering various types of reading materials and information, playing a vital role in enhancing of knowledge and education within our communities [5]. In addition to providing lending, reference, and research services [6], libraries contribute to increasing literacy rates, particularly among youth who are currently experiencing declines. With the advancement of information technology, libraries are adapting information systems to provide collections in digital formats, thereby facilitating access to and management of collections [7].

Well-structured book layouts, such as those in shelving activities, are crucial in facilitating accessibility, optimizing space utilization, and ensuring the security of library collections [8]. Proper book arrangement also enhances efficiency in locating educational resources, supporting student learning processes and research. The effective implementation of well-organized shelving systems is an integral part of effective library management, creating an environment conducive to learning [9].

Weeding, the process of removing irrelevant or outdated book collections, is a critical practice in library collection management [10]. Weeding involves identifying, selecting, and removing library materials according to policy, with the aim of developing collections that meet user needs, efficiently utilizing space, and providing beneficial reading materials for other users [11].

Thus, the integration of information systems, well-organized book layouts, and effective weeding practices forms an ecosystem that supports the strategic role of libraries as efficient and relevant educational resources for society.

2 Objective

The study's goals are to create a web-based tool for tracking shelving and weeding performance at the Library. This tool will help with the following: (1) streamlining the process of recording daily activities related to shelving and weeding; (2) facilitating the effective creation of activity reports; and (3) guaranteeing accurate documentation of tasks carried out by library staff..

3 Method

The methodology employed for developing information systems in this study follows the waterfall model, a type of SDLC (Software Development Life Cycle) that offers a sequential approach to software development. This involves phases such as analysis, design, coding, and testing [12]. Prior to implementing the waterfall model, two preliminary stages must be completed: problem identification and data collection. These initial steps were undertaken through focus group discussions within the internal library team, and then expanded to include discussions with staff and technology developers. Once the waterfall model is in place, there remains one final stage: documentation. The application development then proceeds with the waterfall approach, supplemented by functional testing involving the library team as end users. Therefore, four key groups are involved in this process: librarian employees, library

management, campus application supervisors, and application developers. The methodology involves several stages:

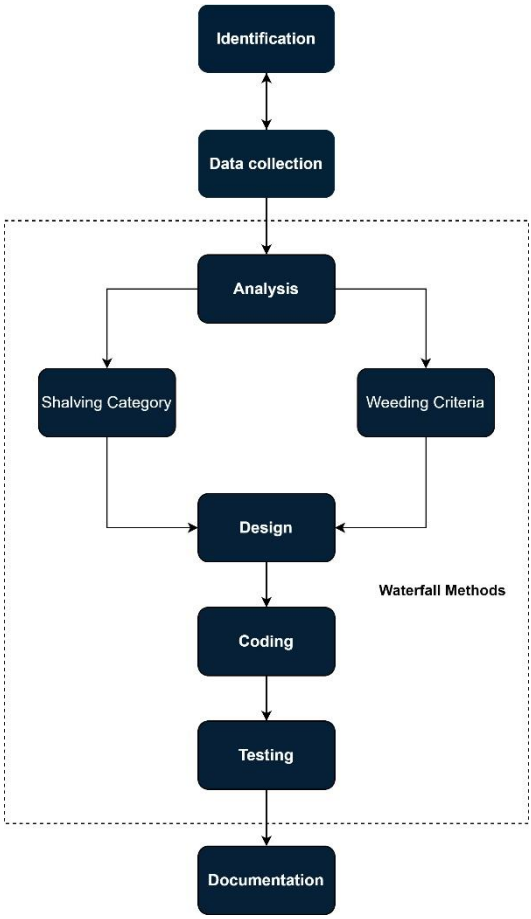

Fig.1. SDLC Methods

3.1 Identifying problems

In order to find development potential, the initial step entails recognizing problems experienced in the area. This was accomplished by holding focus groups with the internal library staff, which gave insights into the difficulties that library services are now facing, such as inefficiencies in the management and tracking of library collections.

3.2 Data collection

Data was obtained using an comprehensive literature review and collection of resource required for the development of the information system. The data collection process involved examining existing library management systems, user requirements, and technological advancements in the field. During this stage, ensured that the information system would be based on up-to-date practices and user needs.

3.3 Analysis

The collected data is analyzed according to the system requirements, including features like card printing, visit history, and borrowing records.
At this stage, the collected data is analyzed according to the requirements for creating the information system. Several features are required in the system, including card printing, visit history, and borrowing records. These features may change based on the needs of the information system.

Shelving Category

Shelving activities involve the placement and organizing of library collections on shelves in order to the applicable alignment system, such as call numbers or alphabetical order. Shelving activities also includes stocktaking.

Table 1. Shelving/Stocktaking Results

	Book ID Number	Classification Number	Title	Number of Copies
1	NIB001	QA76.73.C154	Clean Code	3
2	NIB002	PR6029.O45	1984	4
3	NIB003	RC455.2.C4	How to Win Friends and Influence People	2
4	NIB004	Q325.5.D87	Sapiens: A Brief History of Humankind	5
5	NIB005	PS3558.I4843	To Kill a Mockingbird	4
Total				**18**

The table above shows the results of shelving and stocktaking activities in the library. Here is an explanation of each column in the table:
No.: Entry number in the table.
Book ID Number (NIB): A unique identification number for each book copy in the library. Each book has a different Book ID Number.
Classification Number: Refers to a specific classification system (e.g., Dewey Decimal Classification or Library of Congress Classification) used to group books by subject or topic. The classification number helps in placing books on the library shelves.
Book Title: The full name of the book registered in the library.
Number of Copies: Indicates the number of copies of the book available in the library.
Explanation of Shelving from the Table:
Books are arranged and placed on the shelves according to the applicable alignment system, such as by call number or alphabetically based on the classification system used. The Classification Number is used to determine the book's location on the shelf. For example, a book with the Classification Number QA76.73.C154 will be placed according to the placement rules applicable for that number. The Number of Copies reflects the availability of the book in the library. In the context of the table, each book has a certain number of copies available for loan to library visitors. Stocktaking activities are conducted to ensure that the number of books recorded in the library system matches the actual number on the shelves. This helps maintain the orderliness and readability of the library collection.

Weeding Criteria

Weeding should be done regularly and continuously, at least once every 5 years. The list of collections resulting from the weeding process serves as a basis for deleting collection data from the database. The detailed weeding criteria are as follows:

Type of material	Replace after
Almanacs, yearbooks, statistical compilations	1 year or when new edition is received
Print journals	Keep only 1 year if not indexed
Computer science	3 years
Career	3 to 5 years
Pure science (except botany and natural history)	3 to 5 years
Technology and applied science	3 to 5 years
General encyclopedias	3 to 5 years
Atlases	3 to 5 years
Geography and history	5 to 7 years
Philosophy, psychology, and religion	5 to 7 years
Dictionaries	5 to 10 years
Language	7 to 10 years
Arts and recreation	7 to 10 years
Literature	10 years

Fig.2. Weeding Criteria Guidelines

Figure 2 above covers several aspects related to weeding criteria in library collection management. At least, once every 5 years, the weeding procedure be carried out periodically and continuously, to ensure that the library collection remains updated and relevant to user needs. The results of weeding create a list of removed collections, which serves as the basis for deleting collection data from the library database, showing transparency and accountability in collection management.

The importance of weeding policy as an integral part of library collection development is also emphasized. Weeding is not only seen as a separate action but is integrated into overall collection planning. Written standars process and criteria become the foundation in the weeding process, requires knowledge of the librarian, thoughtful considerations, and careful deliberations. These standard may vary between libraries, depending on factors such as mission, priorities, user types, and physical facilities.

The wedding policy places a strong emphasis on collection pretection and methodical planning. Documented criteria help make weeding and withdrawal decisions more systematically, reflecting the protection of the integrity and relevance of the collection. Overall, weeding is not merely an act of removing out of date collections but a planned and systematic strategy in library collection management. With clear policies, guidelines, and criteria, libraries can maintain the orderliness, relevance, and sustainability of their collections according to user needs and information dynamics.

3.4 Design

UML is used in the design of the information system, which includes use case diagrams, activity diagrams, DFD, ERD, and CDM. furthermore, the user interface design is developed graphically to facilitate the creation of the information system [13]. The next stages following the design phase, including development, testing, and documentation, will be discussed in detail in the following chapter: Results and Discussion.

4 Results And Discussion

Key criteria for the shelving and weeding application were indentified as a result of focus group discussions with State University of Surabaya library staff. These needs are summarized as follows: (1) a shelving report download feature from the SlimS application that adheres to the standards set by the National Library of Indonesia and meets the needs of the Library of Unesa, and (2) a weeding report download feature from the Digilib application that aligns with the SlimS report format and includes relevant fields from the Digilib system.
The developed application addresses these needs by providing specific functionalities designed to improve the efficiency and accuracy of library management processes. The results and discussions of the shelving and weeding features are detailed below:

4.1 User Needs Identification

The initial stage of identifying user needs was conducted through focus group discussions with the employees of the Univers library. This process revealed at least four primary needs for the employee performance management application being developed:

Employee Position Analysis Page

This page functions to evaluate the adequacy of the number of employees based on the current year's conditions. It helps in determining whether the current staffing levels are sufficient to meet the library's operational demands.

Employee Work Goals Page

This page contains achievement targets set at the end of the year for each employee based on the main tasks and functions of the library. It serves as a benchmark for evaluating individual performance and ensuring alignment with the library's strategic objectives.

Daily Proof of Work Recording Page

Derived from detailed job descriptions for each employee, this page is used to record daily work proofs. At the end of the year, these records are used to evaluate performance achievements compared to the employee performance targets prepared at the beginning of the year.

Reminder Page

This page contains all the necessary daily information to ensure that no personal or office activity agenda is forgotten. It serves as a crucial tool for time management and organizational efficiency.

4.2 Development and Functional Specifications

The developed application incorporates eight essential menus tailored to the needs of the State University of Surabaya Library to secure targets and proof of work. The results and specifications of these menus are discussed in detail below:

Shelving Flow Diagram

The shelving process flow diagram illustrates the steps involved in the management of returned books, as shown in Figure 4. When a library member returns a borrowed books, the first step involves the library staff checking whether the book is returned on time or late. If there is a delay, the process includes a step for fine payment before the member is allowed to return the next book. This makes the management of library book process more accountable and organized.

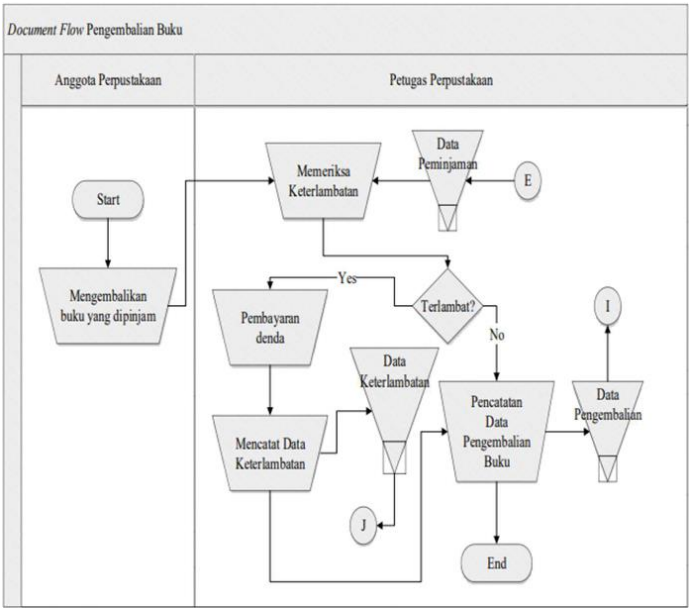

Fig.3. Shelving Flow Diagram

The next step after checking for delays involves recording the book return data. In the case of late returns, recording the delay data is a relevant and important step. This may involve making a note of the fines that the library member must pay. In the meantime, the library personnel can record the book return data right away if the book is returned on time. This entire process helps maintain order and keeping accurate records related to the book return status. Additionally, recording delay data provides insights into library members' compliance with borrowing rules and identifies potential sanctions or fines that must be imposed. Thus, the aspect of shelving or arranging books on shelves

is not only related to the physical placement of books but also involves the management of data and information related to borrowing and returning books.

The next step After recording the book return data, the shelving procedure begins, which comprises restocking the shelves with the returned books. Rearranging the returned books in this case is the responsibility of the library personnel, who must take the call number or the relevant alignment system into account. One essential aspect of managing the library's collection that involves shelving tasks is putting the book back on the shelf.

This shelving process may include looking for available space on shelves that match to the book's categorization or call number. This ensures that the book is returned to its original spot in accordance with the rules governing the layout of library collections. With orderly placement, the library can make it easier for visitors to find the books they are looking for.

The overall process of returning books, checking for delays, recording data, and placing the book back on the shelf constitutes a series of integrated activities in library management. This creates an orderly, efficient library environment that facilitates visitor access to the available collection. Therefore, the aspect of shelving encompasses not only the physical layout of books on shelves but also involves the administration and management of information related to borrowing and returning books.

Stock Opname Flow Diagram

The stock opname process in the library, as depicted in Figure 5, begins when the library staff hands over a list of books to the stock opname checking team. In this initial stage, the library staff is responsible for providing a list of books to be subjected to stock checking. This process aims to ensure that the library's data aligns with the physical availability of books on the shelves.

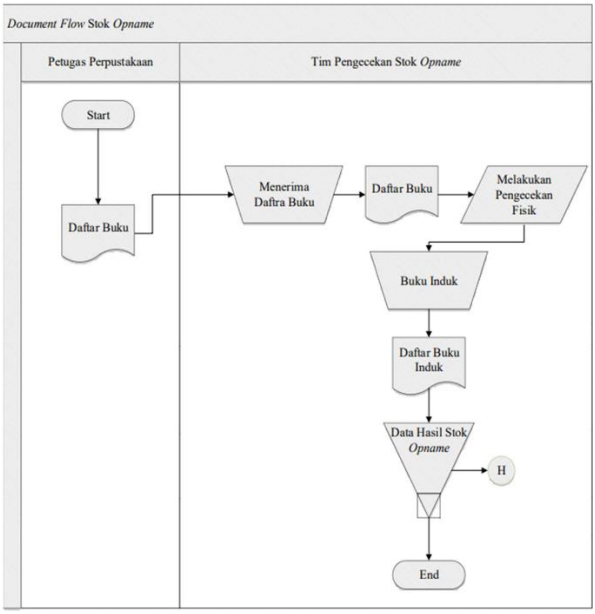

Fig.4. Stock Opname Flow Diagram

Upon receiving the list of books, the stock opname checking team conducts a physical check of the books by referring to the list. At this stage, each book is examined to verify its presence and condition. Subsequently, the team records the results of this check in a master book. The master book serves as the repository for the stock opname results, which includes actual information about the availability of books in the library.
This recording process is a critical reference in determining discrepancies between the recorded data in the system and the physical availability of books. This step also contributes to the orderliness and accuracy of the library's information. The entire stock opname process helps the library ensure that its book collection remains well-managed, providing a basis for identifying and resolving differences between records and the availability of books.

Weeding Flow Diagram

The weeding process in the library, as illustrated in Figure 5, begins when the library staff submits the stock opname results to the stock checking team. In this initial stage, the library staff provides information on the stock opname results, including books identified for removal from the collection. This process serves as the basis for determining which books will be weeded out from the library.

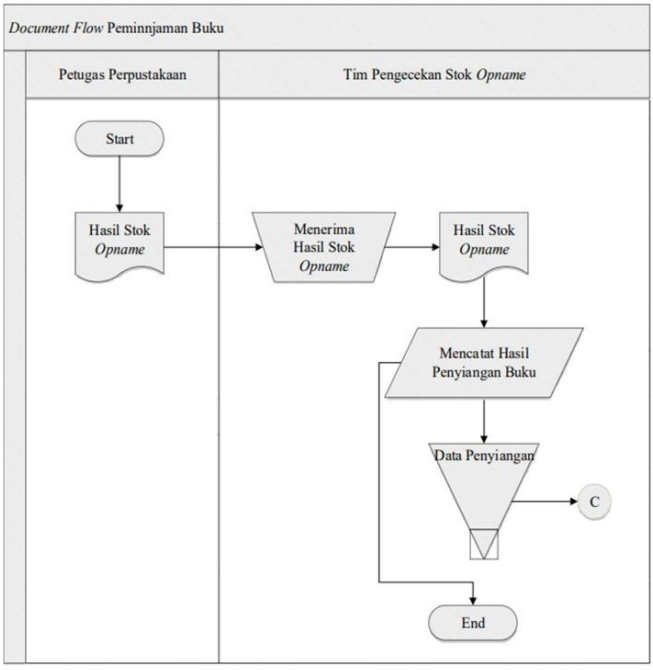

Fig. 5. Weeding Flow Diagram

After receiving the stock opname results, the stock checking team records the weeding results and stores them in a weeding document. At this stage, each book identified for weeding is detailed in the weeding document, including the reasons for its removal. This document can later be used as a reference and formal record of the weeding process.

The process of recording weeding results by the stock checking team helps the library carry out its weeding policy in an organized and documented manner. This ensures transparency in the management of the library's collection, while also providing useful information for decision-making related to collection maintenance and development.

4.3 Report Generation

The process of creating report formats for shelving and weeding activities is currently underway. The data for shelving reports is sourced from the SlimS application (https://sirkulasi-lib.unesa.ac.id). The report format adheres to the regulations set by the National Library of Indonesia Regulation No. 7 of 2023 on quality standards and assessment guidelines for library assistant performance and is adjusted to meet the needs of the State University of Surabaya Library.

Example of Shelving Report Download from SlimS

Table 2. Shelving/Stocktaking Results

No.	Book ID Number	Classification Number	Title	Author	Number of Copies	Shelving Date
1	380140-000221230080	V 530 ASR f	Fisika Dasar Untuk Sains Dan Teknik Jilid 1 Mekanika	Sujiwo	3	5 April 2024
2	380140-000210220001	V 378.155 598 28 MEN	Mengepak Sayap: Unesa Membangun Negeri Dengan Hati 1964-2021	Suwono, Projo bahar	4	5 April 2024
3	1002/IKIP/98/P	V 796.8 PRI p	Pembinaan kondisi fisik karate optimalisasi kondisi fisik atlet menuju prestasi puncak	Prihastono, Arief	2	5 April 2024
4	380140-000230230211	371.337 MUL p	Permainan Edukatif: Untuk Mengembangkan Kemampuan Bahasa Anak Usia Dini	Mulyani, Novi	5	6 April 2024
5	380140-000221230998	297.273 MAU m	Memajukan Industri Keuangan Syariah Berdaya Saing	Mauleny, Ariesy Tri	4	6 April 2024

Example of Download Report from Digilib

The data for Digilib reports is sourced from the Digilib application (https://digilib.unesa.ac.id). The report format is modeled after the SlimS report format and adjusted to the fields available in the Digilib application. Example of Shelving Report for Scientific Works Collection:

Table 3. Shelving/Stocktaking Results

No.	Document Code	Main Author	Main Author NIM	Title	Number of Copies	Shelving Date
1	0028/FISH-AN/2019	Rio Tri Putra Setiawan	14040674059	Strategi Pelayanan Ruang Tunggu Keberangkatan Terminal 1 Bandar Udara Juanda Surabaya	3	5 April 2024
2	0004/PASCA-T-SAINS/2024	Agustina Dua Kuki	21070795037	Pengembangan Modul Ajar Model Argument Driven Inquiry (ADI) Berkonteks Socioscientific Issue (SSI) Untuk Meningkatkan Keterampilan Argumentasi Peserta Didik pada Sub-Topik Faktor-Faktor yang Mempengaruhi Laju Reaksi	2	5 April 2024
3	0002/PASCA-D-VOK/2023	Biwara Sakti Pracihara	18071306005	Faktor-faktor yang Mempengaruhi dan Strategi Solusi Mengurangi Peserta Didik Drop Out pada Sekolah Menengah Kejuruan Bidang Seni Budaya	4	5 April 2024
4	0006/FT-TA-PTE/2019	Febriansah Puji Wahyudi	16050413018	Pemrograman Software PLC CP1E	10	6 April 2024

5	0055/FE-ADPER/2020	Oktafia Ika Handarini	15080314019	N20DRA-HMI Sebagai Pengatur Beban Pada Instalasi Listrik Pembelajaran Daring Sebagai Upaya Study From Home (SFH) Selama Pandemi Covid 19	2	6 April 2024

4.4 Coding and Testing

Following the design phase, the web-based information system for the digital library card functionality was developed using the Laravel framework. The outcome of this stage is an information system built in accordance with the previously designed specifications. The testing phase is conducted to ensure that all menus and features in the information system function properly. This phase also involves evaluation based on ISO 25023: 2016 on the Measurement of System and Software Product Quality, specifically focusing on usability aspects. The testing primarily involves academic community members with accounts in the SSO Unesa. The testing is limited to the functional system according to the needs and features of the digital library card information system.

4.5 Documentation

The documentation stage aims to record all the steps undertaken in the development of the information system. Documentation also aids in the evaluation process if necessary. This comprehensive documentation ensures that all aspects of the system's development are well-documented for future reference and continuous improvement.

Acknowledgments
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