Abstract

The purpose of this research is to develop a library system by implementing an integrated procurement flow, return and borrowing books, so that the inter-library loan can be done in an integrated manner, with the hope to facilitate members to borrow varied books thereby increasing library transactions. The methods used include the method of analysis in the form of literature and field studies to observe the activities of the running system, interviews with stakeholders, user surveys and design method using the Unified Modelling Language, and design the system architecture and features. The result of this research is the development of the library system by implementing an integrated flow of circulation of books between libraries. The conclusions of this research is to implement an integrated book circulation between libraries, then the inter-library loan can be done in an integrated manner.

Keywords: Integrated Book Circulation; Inter-Library Loan; Library.

1. Introduction

Since the early 21st century, web technology has been developing rapidly. Xiaohua Li says that the Web 2.0 concept has reign all over the internet which emphasizing on users online experience, forcing the use to interact and contribute actively rather than leeching for information. The Web 2.0 concept contributes greatly to the development of Library 2.0. Library 2.0 itself focuses on developing user-centered services where the user can access and interact with libraries whether physically or virtually. However, library development with online public access catalog (OPAC) faces stagnation and Library search mechanism slowly deteriorate. Libraries, which is faced by declining budget and complex library system, in need of effective technological aid to manage circulation. Also, the libraries
need to do slimming on staff, but still able to handle growing collections. Because of the reasons mentioned previously, there is a need of an effective technology aid to manage the circulation flow. Wang, cited by Xiaohua Li\textsuperscript{1} mentioned that Integrated Library System (ILS) is really affected by web development to develop an integrated system with newest technology and interesting features. The main challenges faced by ILS are static and outdated interface, aren’t scalable, and not user friendly.

Users who are searching for book often searching for the book via provided catalogue. After obtaining preferred book code, they go to designated bookshelf and keep searching for the book until the book is found. This kind of searching might take some time if the collections are huge. The other problem arises when the library users busy with their activities and as the result, they can’t visit the library very often. Limited collections are another big problem nowadays on smaller libraries, making their appeal less interesting on library users.

It is libraries’ responsibility to accommodate library workflow, serve interactive web, and improving collections in facing problems such as advanced technology, economy impact, and growing collections. Hopefully by applying recommended service of integrated library system, all problems mentioned are resolved.

1.1. Problems

Problems that will be explained in this paper are:
- How to integrate book circulation system which are on certain territory
- How to implement easy to use and understand online book procurement flow

1.2. Purpose

The purpose of this research:
- Develop web-based integrated library circulation software.
- Building a library system to facilitate an automated interlibrary-loan without needing too much library staffs manual approval.
- Designing and implementing interface and functionality to front-end interactive and informatively in order to appeal users to this library system.
- Develop an integrated payment system with e-wallet feature.

2. Methodology

The objective of the survey is to assess problems faced mainly by library users. Data were collected by means of a questionnaire containing closed-ended questions and provides ‘Other’ option when the provided answers don’t satisfy participants. The analysis on survey therefore involved quantitative data only. The data obtained were used as feature design analysis. The survey was conducted by online and are shared among students who have access to library. The question mainly asks about experience in using participants’ accessible libraries and highlights features available on said libraries and improvements that could be done on the system.

Other methods used is direct observation to libraries on circulation process, procurement, and internal activities happened in a library system. The library staffs were also asked on how should a process be done and simplified. The observed processes are generalized and used as the basis for implementing interlibrary system workflow.

To analyze library needs as one of the stakeholders, we conducted one-on-one interviews consists of several questions and focuses on existing implemented library system with libraries’ supervisor. The questions asked are mainly about what information should be viewed on pages and rules on acquiring new collections.
Lastly, some literature reviews were conducted to summarize both strengths and weaknesses of past library applications or which are still in active development but support none or partial interlibrary circulation transactions.

3. Results

The following are results for survey and observations done. The graphics below explain suggested system that can be implemented to library system. Modular system design is used rather than centralized system design. With modular design, the library system will be divided into two subsystem: intra-library and inter-library respectively. Libraries interested in joining the system will have to install application provided in their intra-library network and register in the inter-library system. The application provided itself is a library application which supports both intra and inter-library circulation.

3.1. Features

The features of the system are:

- Online Public Access Catalogue
- Review and rating system
- Popular books
- Member management
- Book management
- Collection management
- Borrowing and returning
- Booking online and book delivery to preferred library
- E-Wallet

3.2. Intra-library

Every local circulation such as intra-library loan, book reviews, and member management will be done locally. Both database and application will be hosted on local library’s network. The local system doesn’t need to contact the bigger inter-library system when doing local transactions. Diagram shown below is a system design in which the intra-library system is implemented with centralized design where the web application is hosted in the main server and can be accessed via browser from staff’s or user’s PCs.

![Fig. 1. (a) Intra-library System](imageURL)
3.3. Inter-library

The interlibrary system covers transaction that is done using internet connections. When doing transaction, intra-library system can access other library’s system by accessing inter-library system hosted in the cloud. Below is the diagram of inter-library system. Members of a library can loan other library’s book by requesting the book via their local library system. The local library system then will contact the book owner library and asks for approval on the request. The book owner library then will send the book where the requester asked. The book tracking then will be handled by the system as there will be interaction in the system by the librarian every time the book arrived, sent, or being picked up by the requester.

Fig. 2 Inter-library System

The diagram above is the implementation of the modular system. Each library will have their own intra-library system where all of them are registered in a single inter-library network. The inter-library network itself is a collection of API which enables the inter-library transactions such as inter-library loaning. Additional services outside of intra-library core service implementation, such as mail server for mail notification, are provided in the inter-library server rather than in every intra-library server.

4. Discussion

The decision on creating a simple application that supports only essential features are based on the need of masses. Most of the target library mentioned that either the current library application are too hard to learn or hard to maintain because of the complexity of the application. With this in mind, the application was created as simple as possible to ensure easiness in development, maintenance and scaling. Also the feature “Booking book online and book delivery to preferred library” are the most popular feature requested. Often users are forced to come to library and fill booking form so that the librarian could contact other library to borrow the book. The booking online feature eliminates the need of going to library, making busy user able to borrow books not available on their accessible library despite their activity.

Modular design is used to design the system in order to minimize the application unavailability when one or more system is down. For example, when the inter-library system is down, the normal intra-library system could still operate normally. Otherwise, if the system is designed with centralized system, failure in the system means every library connected to the system will be unavailable until the system is fixed.
5. Conclusion and future work

This paper has conducted survey on how improving a better library, which is able to compensate on library’s user daily activities. Most of the existing library application solution freely available on the internet are centralized system. By developing the system with modular design, the library application will be easily maintained and are more scalable. The only problem that persists are the agreement between libraries and the infrastructure of the library itself. Without a good network connection, libraries will not be able to maximize the advantage gained by implementing this library system.

References

