



# Research on Shared Information Management in University College Reference Room

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**Abstract.** In the current university reference room, there are some problems such as backward system facilities, simplistic manual management, and limited funds, resulting in the repeated purchase of scientific books, non-transparent reference information as well as the waste of funds, which reduced the staffs work effectiveness and decreased references circulation. Taking Inner Mongolia University for example, we designed and developed a shared information management system for reference rooms. This system uses web service and three-tier architecture to simplify the workflow of reference room administrators, changes the previous lack of manual processing mode, achieve the resource sharing for research funding books and so that it can save money, meanwhile, it provides a quick and convenient query service for teachers and students.

**Keywords:** Reference room · Shared information management  
Web service

## 1 Introduction

University college reference room is one of the important sources of information for teachers and postgraduates. Due to the shortage of staff, the backward system facilities and the limited funds, the management of the most universities college reference rooms is still handled manual. Such backward treatment not only increases the workload of the staff and reduces the efficiency, but also takes inconvenience to the borrower's checking and borrowing, so that reduces the circulation of reference. In order to make up for the lack of manual processing, we develop a college information room management system to achieve shared information management. In this paper we present the analysis, design, and implementation process of the reference room management system.

## 2 Current Status of College Reference Room Management

Take College of Computer Science for example, College of Computer Science of Inner Mongolia University was established in 1997, and the college reference

room has kept abundant books in computer science and related fields, including computer application basis, discrete mathematics, Programming, network theory and development etc. College has 55 kinds of Chinese periodicals and 13 kinds of foreign periodicals. With the development of computer science in recent years, the college has undertaken more than 60 scientific research projects at the provincial and national level, including 50 projects funded by the National Natural Science Foundation of China, 6 key projects under the Ministry of Education, 6 projects under the Ministry of Industry and Information Technology Development Fund, 6 key projects in Major autonomous regions. These projects encourage teachers to spend large amounts of funds to purchase the necessary books and materials, and the books are targeted, practical and timeliness. However, due to the outdated management, there are disadvantages of repeated book and material purchase, book and material information is not disclosed, and so that cannot share the resource. Our library information management system provides eight management modules including user management, book management, periodical management and loan management etc., as well as six user modules such as reference inquiry and reference application, which realizes information management of information and satisfies user query, borrowing, application and other needs. Meanwhile, it achieves generating report, uploading, downloading, collection, sharing, sending message, online retrieval and other features.

### 3 System Design and Implementation

According to the actual needs of the reference room, all users are divided into two categories, including ordinary users, and administrators. In addition to the needs of two types of users, reference rooms requirements should also be considered when developing the system. The main needs of ordinary users are data query and borrow materials. To meet this demand, the primary task of the system is to provide comprehensive and standardized reference and information. Apart from the basic information, the system should provide information such as catalogs, profiles and other information to facilitate the borrowers' search, reference and borrowing. Second, in order to provide a better rental service, in addition to providing comprehensive information, the system should provide detailed loan information for each reference to inform users of the current borrower of the reference and the earliest return time of the reference. Finally, the system should automatically generate borrowing log information according to the borrowing situation, and feed the borrowing log to the borrowers. According to the characteristics of the reference room, users can also apply for information, the academic research purchased reference into archive reference. The main requirement of the reference room manager is the management and maintenance of much information: such as books, magazines, loaning business and users. The administrator needs to manage the above information conveniently and quickly through the system, and back up, update and maintain the information and report the information. Because of the huge amount of information that is managed and maintained,

the system should provide convenient and fast information entry functions. For example, books, periodicals and other materials require a large amount of information to be entered. However, such information can be obtained by querying the ISBN number or the ISSN number. Therefore, this access to information and information interface to reduce the workload of the input reference. Reference room construction needs are the most important; reference management system is different from library management system, reference management focus on the construction of the reference, which has a strong professional pertinence. Therefore, the system of reference management and maintenance should be based on the actual situation of the college, according to their professional characteristics of reference classification.

## 4 System Outline Design

### 4.1 Module Design

According to the characteristics of college reference room management and actual needs, the system is divided into two parts, including the user system and administrator system. The common function of both systems is to log in and retrieve the password. The system function structure module is shown in Fig. 1.

### 4.2 System Main Function Flow Chart

According to the data room business processes and system requirements analysis and functional module design. System main function flow chart was shown in Fig. 2.

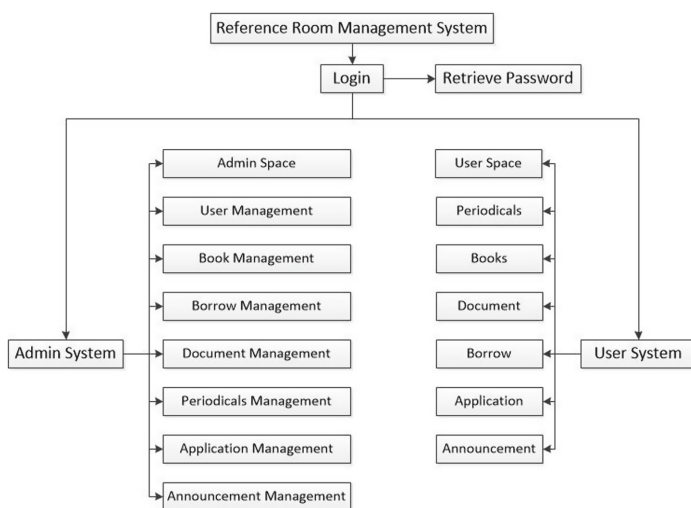


Fig. 1. System function structure module

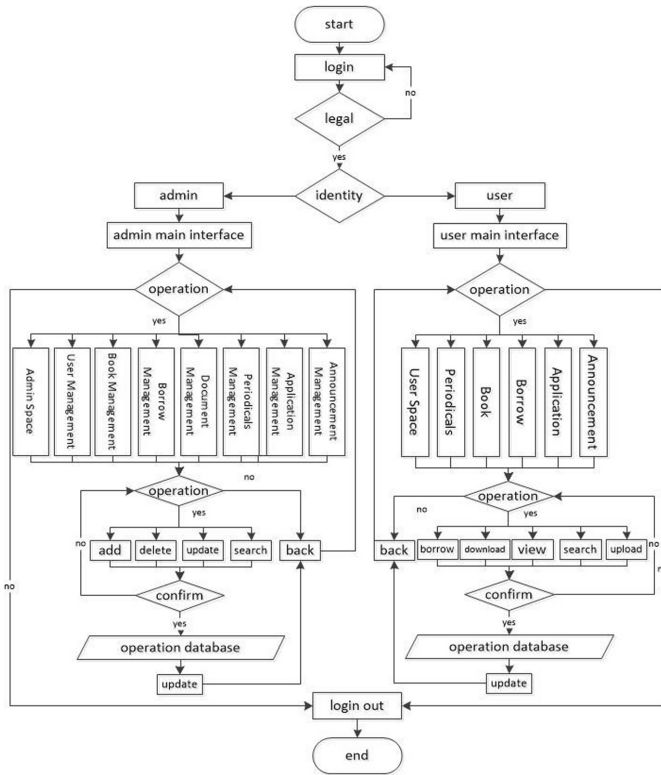


Fig. 2. System main function flow chart

## 5 System Model

### 5.1 Login Module Design and Implementation

The login module is the entrance to the college reference room management system. The front of the login module is a login.aspx page, the form is defined by the *<form>* tag, and two *<input>* tags are defined in the form for obtaining user name and password. The login.Click method of the login page background verifies the login information of the user by calling the userinfo service published by the Web Service. If the authentication succeeds, the user interface of the login page or the login page of the administrator is entered according to the user type and the login information is stored in the session. If the user is logged off or entered incorrectly by the administrator, the page prompts the corresponding error message. The login page is shown in Fig. 3.

### 5.2 Design and Implementation of User Management Module

User Management part includes additions and deletions to change all users, change user status, export information to Excel and other functions. It has a

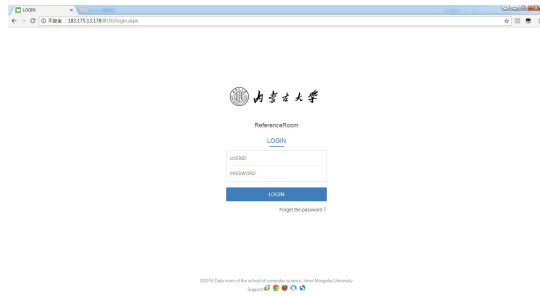


Fig. 3. Login page

variety of ways to check users, supports paging and photo display. When add users to the system, it supports local upload and multiple formats of image files.

### 5.3 Design and Implementation of Book Management Module

The book management module contains all kinds of books and information to add, delete and export the information to Excel. Support a variety of query methods, page display, book information, as well as image display. The page list shows the key information of the book; click the title hyperlink to view the book details. The book management page is shown in Fig. 4.

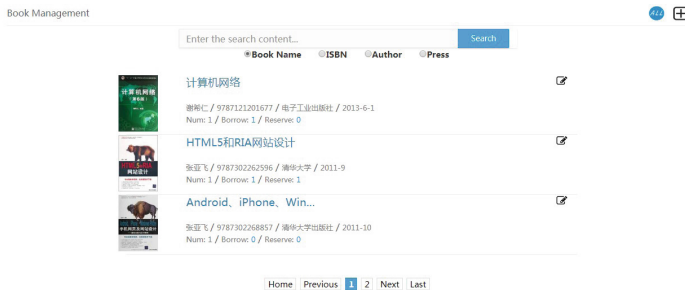


Fig. 4. Books management page

### 5.4 Design and Implementation of Loan Management Module

Lending management module includes borrowing, booking, return information management and reminder and other functions. The current lending function displays three types of loan information, including “no reference”, “borrowing” and “overdue to be returned.” “No reference is received” means that the pre-borrowing is successful and can receive the reference. For the borrowing information of “Borrowed” and “Expectable to be returned”, a refund can be performed.

In the extended reimbursement function, you can view all extended lending information, click the “reimbursement” system to send overdue reminder mail to all overdue users. In the history lending function, you can view the borrowed information of “returned” and “canceled”; “canceled” means that the user cancels the loan himself or fails to receive the materials within 3 days before receiving the reference. The system automatically cancels the loan. In the reservation information function, you can view the reservation information of “active”, “canceled” and “expired”; “active” means that the currently reserved book has not been returned by the borrower, the reservation user needs to continue to wait; “canceled” means the user cancels the reservation on his/her own account. When the reserved book is returned by the borrower, the system will send the information to all subscribers who subscribe for the book to borrow the information and set the reservation information as “expired”.

### 5.5 Application Management Module Design and Implementation

Application Management contains the current application and application history; used to manage the application and review books. The current application page shows unapproved application information. The application approval page displays the unapplied user application information for the administrator to review the application. The history application page shows the completed applications. Support image display and paging, page list displays application for key information and clicked the book name hyperlink to view the details.

### 5.6 Design and Implementation of Notice Notification Management Module

This module provides announcement of the information addition, deletions, checking, changes, shows bulletin information and shows the key information of the announcement. Click the title link to view the announcement details. Notice notification support attachment upload, you can upload various types of attachment files. Announcement notification management page is shown in Fig. 5.



Fig. 5. Announcement notification management page

## 6 Design and Implementation of User Module

User system has six modules; including user space, reference topics, periodicals and magazines, notice notification, reference query and reference application. The foreground of each module function is an aspx web page, all the pages apply the master page user. Master unified page layout, each page defines the  $\langle TextBox \rangle$ ,  $\langle DropDownList \rangle$ ,  $\langle RadioButton \rangle$  and other controls in the  $\langle div \rangle$  layout Input and selection of information, use  $\langle GridView \rangle$ ,  $\langle Button \rangle$ ,  $\langle Label \rangle$  and other controls to display information and complete the operation of information. The back end of each module function is an .aspx.cs file, and the background obtains the information reference set Reference Set by calling the service published by the Web Service and displays the information in the  $\langle GridView \rangle$  control through other interface functions provided by the service. The function of each module, page design implementation described below.

### 6.1 Design and Implementation of User Space Module

There are user login information and unread new information in the upper left of the user interface, and the entrance of the six function modules is provided in the left navigation bar and the upper function bar. User space module has user information, message center, upload reference and user's collection and loan information, as well as upload topics and information of a total of seven functions. The main user interface is shown in Fig. 6.

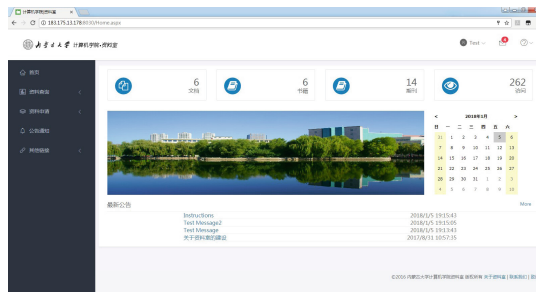


Fig. 6. User main interface

The design of each function in user space is described as follows:

- (1) My information is used to display and manage the basic user information.
- (2) Message center is used to display and manage the user's mailbox information. Divided into inbox and outbox, page shows mail information.
- (3) My collection is used to display and manage the user's favorite information. Divided into topics, materials, books collection.

- (4) My borrowing is used to display and manage the user to borrow information. The current lending function shows pre-lending success and borrowing of uncommitted lending information and completing the cancellation of pre-lending; the user can view the lending information and cancel the pre-lending. Historical Lending function shows the loan information has been returned, "canceled" means the user to cancel the pre-lending before receiving the reference, "expired" means the system did not receive information within 3 days the system automatically cancel the pre-lending. Reservation information function shows all the reservation records, support the cancellation of reservations.
- (5) My topic is used to display and manage the user's topic information, including the subject of additions and deletions to change the topic information.
- (6) My Upload is used to display and manage the electronic documents uploaded by this user.
- (7) Upload reference is used to upload electronic documents for users, which supports a variety of file types.

### 6.2 Design and Implementation of Reference Topic Module

Reference thematic module contains the query, view and downloading all reference topics. Which support a variety of query methods and page display thematic information. The page list shows thematic key information. Click the title link to view the details. View reference in the special page can download, collect and contact the uploader.

### 6.3 Periodical Magazine Module Design and Implementation

Periodical magazine module includes inquiry, view and borrowing all periodical information. Support a variety of query methods, page display journal information, support for image display. The page list shows the journal key information. Click on the title link to view the details. In the Journal Information page, you can borrow an appointment for a review journals, you can also view the contents of the download journal catalogs. Check the magazine page is shown in Fig. 7.



Fig. 7. View journal magazine page



## 6.4 Design and Implementation of Notice Notification Module

Announcement notification module are used to view and download announcements. Paging shows bulletin information and the page list shows the announcement key information. Click the title link to view the details. In the bulletin information page, we can download the relevant attachments and send email to the administrator. Check the announcement notification page is shown in Fig. 8.

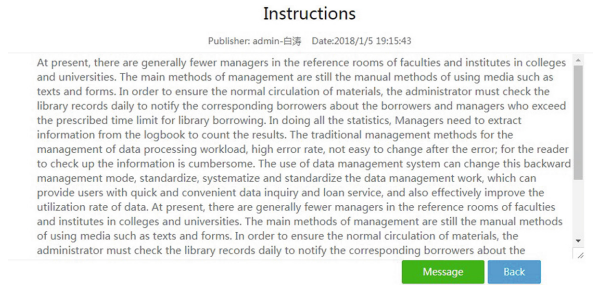


Fig. 8. View notice notification page

## 6.5 Design and Implementation of Reference Query Module

Reference inquiry module contains electronic document inquiry and book information inquiry. The Electronic Reference Inquiry page displays all the electronic documents that meet the search criteria. Query conditions are divided into name, uploader, keyword query and type and attribute query, query are fuzzy query and paging information. The page list shows the material key information. Click on the reference name link to view the details. The book information inquiry page displays all book information that meets the search criteria. Support a variety of query methods, page display book information and support for image display. Page list shows the book key information. Click the title link to view the details.

## 6.6 Reference Application Module Design and Implementation

Information application module contains my application and application information; used to view the application information and application information.

- (1) My application contains the current application and history application. The current application page displays the application information that the user has not been approved, and supports the modification operation. The history application page displays the application information that the user has already reviewed.

- (2) Application information page are used to apply for information for users. The requested information can be input by the user or through the online library API library query.

The reference application page is shown in Fig. 9.



Fig. 9. Information request page

## 7 Conclusion

According to the specific needs of university college reference room, College Reference Room Management System established a reference management system that meets the needs of reference room managers and borrowers and systematically manages the reference. The goal of the system is to streamline the workflow of the reference room manager, change the shortcomings of previous manual processing and improve work efficiency. At the same time, provide fast and convenient query and loan services for borrowers. The college reference room management system runs well after being deployed and used. The system can be accessed through any browser connected to the campus network to meet the needs of systematization of information rooms.

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