Design and Research of Mobile Phone Library Management System in Private University based on ASP.NET

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Abstract. Mobile phone library is also called "mobile library". It is a new way of library information service that people can query and access library information resources by using mobile devices, such as mobile phones, without limitation of time and space. ASP.NET Core open source, cross platform technology is a new breakthrough and innovation of ASP.NET, especially worthy of our study. This paper studies the characteristics and needs of private university libraries. According to its characteristics and needs, the function and design of mobile library management system are deeply studied, so as to apply ASP.NET technology to design and develop private university library management system and it can provide high-quality document information service for teaching and scientific research, and meet the information needs of teachers and students.

1. Preface
With the development of network communication technology and the more powerful and less expensive of smart mobile phone, More and more people are using mobile phones to obtain information resources on the Internet. It is a general trend and the necessity of the development of the times for college students to use e-book to read online. At present, the equipment resources of private university libraries in our country are insufficient and it does not meet the needs of users (teachers and students). Mobile phone library can provide users with characteristic literature resources and orderly network literature resources. It also can provide the "knowledge of knowledge" after accumulation, abstraction and sublimation. Mobile phone library is also called "mobile library". It is a new way of library information service that people can query and access library information resources by using mobile devices, such as mobile phones, without limitation of time and space.

Readers of private university libraries are about 20 years old college students and young teachers who always carry a 4G mobile phone and can quickly and effectively access the network information they want through the mobile phone. The establishment of mobile phone library can extend and expand the traditional library services, so that students can easily access the library services they need whenever and wherever possible. This topic applies communication technology and WEB technology to library services and established the WAP (Wireless Application Protocol) website which has the characteristics of flexibility, convenience and immediacy for mobile phones and other wireless terminals to obtain information services. The development of this system can provide high-quality information services for teaching and scientific research, and greatly satisfy the knowledge and information needs of teachers and students in private universities. This makes the library better serve the teaching and scientific research in private universities.
2. Characteristics of Private University Libraries

Private higher education is developing vigorously in our country, and the scale of school running is becoming larger and larger, and it forms an important force in running higher education. Private university library is an important part of the development of private colleges and universities, and it shoulders the responsibility of serving the teaching, research and university students. It is necessary to take library construction as one of the important contents of the basic teaching construction and must strengthen the competitiveness level of its own university library, if private colleges and universities want to obtain favorable competitiveness, sustained and healthy development in the fierce competition environment. At present, private colleges and universities pay more attention to library construction, but there are still many problems from the current development status.

2.1. Insufficient Capital Input

The funding sources of private university libraries are limited compared with the public universities, because the library investment depends largely on the relevant leadership of the school invested by private enterprises and the attention of investors to the construction of the library. There are a lot of instability factors, which lead to the construction of library resources, such as collection of books is not guaranteed.

2.2. Slow Modernization

The management mode and equipment of the private university library are outdated compared with public universities, and the advanced modern technology can not be flexibly applied to the daily work of the library. The hardware facilities such as computer management, electronic retrieval and electronic reading are still not perfect and the electronic reading room is insufficient in private university libraries.

2.3. Library services can not meet the needs of users

Private university library management services can not meet the needs of users compared with the well established public universities. The main function of the library is to realize the sharing of books and materials, to play its due role in professional teaching and academic research, and to count and manage the relevant information of borrowing and returning books. The allocation of library management personnel in private colleges is limited and the opening time of the library is the same as the students' class time, and the library is closed When students are available to the library access to library resources, thus these reduce the use of library resources and the enthusiasm of teachers and students to use resources.

3. Function Analysis Of Mobile Phone Library Management System

3.1. Demand Analysis Of Private University Library

The author believes that the core competitiveness of private university libraries includes three aspects: the first is the various resources of the library which have unique competitive advantages; second is advanced technology which is the means to develop the library; third is to meet the needs of readers services. Strengthening the utilization rate of e-books through mobile libraries makes up for the limitations of the hardware, such as computer management, electronic retrieval and electronic reading, which are still imperfect in the private university libraries.

The realization of private university library mainly needs to meet the following functions:

(1)Borrowing status inquiry: Users can query the information such as the history of personal books borrowing and borrowing books (Including borrowing design and return time).

(2) E-book Sharing: Users can share books in the mobile library. That is, everyone can upload good e-book to the platform when you has it, other users can download to read after the administrator audit, to achieve the role of sharing.

(3)E-book query and download: Users can query and download e-books according to their own
needs

(4) Book review: Users can comment on books they are interested in

(5) Personal information management: Users can modify personal information, such as hobbies, book review

3.2. Analysis Of System Function Module

Mobile library combines mobile communication network and library system through extending traditional library services by mobile terminals. It has the advantages of flexibility, convenience and instantaneity compared with the traditional service mode. The establishment of mobile phone library can extend and expand the traditional library service, and can enhance the following services of Library: First, readers can read instantly using the scattered time without the restriction of time and space; Second, readers query library bibliographic information, retrieval, etc, to enjoy the library resources and services quickly. Third, it can introduce library resources to readers regularly, and improve readers' understanding of library dynamic information.

According to the above requirements analysis and the demand of private university library, mobile library management system mainly includes administrator module as shown in Figure 1. The mobile phone library management system is divided into ordinary user module and administrator module. The ordinary user module function mainly includes: Sign In, Book Query, E-book Download, Book Borrowing Information Inquiry, Sharing E-book, Book Review After Reading etc; the administrator module function mainly includes: Sign In, Books Management, Users Management, Sharing E-book Review etc.

4. Database Design

Database design and structure planning must be designed to meet the needs of various functional modules of the system in order to meet the needs of the system function modules of private university libraries and we must find out the relationship between database design and structure planning. The entity of database design includes administrator entity, user entity, paper book information entity, borrowed book information entity, e-book information entity, forum information entity. The E-R diagrams of entities and entities are planned as follows according to some entities. After the
The conceptual structure of the database is designed, it can be transformed into the data model that is supported by the database system. The data table of library management system can be designed by using SQL Server 2008 database technology.

By Figure 6 entity relationship diagram, we know that Administrators and ordinary users establish contact through management and administrators can add users, modify user information, delete graduated students and leaving teacher users. The relationship between administrators and books is also managed. The administrator can realize the functions of updating, deleting and querying the paper books and e-book. Administrators and users must have real name authentication and password login when entering the system.
5. Development Technology

Android system is an open source system for mobile phones, and there is a mature system for the design and development of mobile library by using Android. As early as 2015, Microsoft announced that ASP.NET5 is open source and a cross platform. The book written by Li-Zheng in 2017 entitled "Microsoft open source cross platform mobile development practice" which is published by Tsinghua University press describes the ASP.NET Core, Apache Cordova, Xamarin and Azure rapid construction of mobile application solutions and specific methods. ASP.NET realizes open source and cross platform, not limited to knowledge assumption. This research based on ASP.NET Core new technology platform and combined with the characteristics of private university library explore the development of mobile books.

5.1 ASP.NET Core

ASP.NET Core has made significant changes compared with the previous ASP.NET, and its main new features include:
1) Project.json file using JSON format
ASP.NET Core has changed the way that web.config has been used as a web site configuration file, and it uses the project.json file in JSON format.

2) Decoupling of OWIN and IIS
OWIN standardizes the call relationship between web server and program, and it achieve cross platform conditions through the implementation of OWIN interface web server support ASP.NET.

3) New HttpContext
The methods in the new HttpContext type support asynchronous calls, and it forms a high performance web processing framework for ASP.NET Core.

5.2. MVC 6
MVC 6 which improves the function of merging technology stack and model binding in open source and cross platform technology is the core component of ASP.NET Core.

6. Conclusion
At present, there are some researches on the design and development of mobile library, but there is almost no mobile phone book system developed for the characteristics of private universities and the shortage of private universities. ASP.NET Core open source, cross platform technology is a new breakthrough and innovation of ASP.NET, especially worthy of our study. Using ASP.NET technology to design and develop private university library management system can provide high quality document information service for teaching and scientific research, that greatly meets the needs of teachers and students in private universities for library knowledge and information, and makes libraries better serve the teaching and scientific research in private universities.

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