Learning material management system based on database

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Abstract. In recent years, with the rapid development of Internet technology, more and more online learning methods have emerged, and the main body introduced in this article is the integration of the original offline data and the status quo of online learning and database development. Under the premise of, under the review requirements of undergraduates at the end of the direction, the design of learning materials management system.

Keywords: database; learning materials.

1. Introduction

With the rapid pace of my country's entry into the Internet era, learning materials have gradually got rid of the constraints of paper books and entered the electronic reading mode. The changes in readers' reading habits have changed the configuration of some college libraries, and also changed the way students review, which, while presenting challenges, also broadens opportunities for innovation.

In order to better manage all kinds of learning materials, a database-based learning materials management system came into being. This system is based on databases and WeChat. Its characteristic is that users can experience data visualization through this system. All kinds of learning materials can be quickly queried through mobile phones. As the national software with the highest number of users and the most frequent use, WeChat has realized the integration of communication, social networking and public platforms. After the system is launched on the WeChat public platform, it can open government accounts, media, enterprises and other institutions, open public accounts to communicate with other users, further improve the popularity of the system, realize the real-time update of user review materials, and add more additional functions.

2. Design background

There is such a pain point in the learning life of contemporary college students: the classroom rhythm is fast, and a lot of knowledge needs to be digested and absorbed autonomously after class. However, the market textbooks, teaching aids, and online library are large for the audience, so there are shortcomings that are not targeted and the degree of knowledge integration is low. In order to obtain richer and more suitable curriculum resources for the teaching scope, students often need to collect and organize them everywhere, the time cost is huge. So often interested students will summarize the difficult points, typical examples, and reference templates into documents and share them. The document is widely circulated among students, and it can also explain the actual demand.
In this case, if a platform can collect and scientifically classify the school's learning materials in a relatively large range, it will definitely make high-quality resources more accessible and widely shared, thus solving the problem of more students. Give full play to the greater value of intellectual surplus; if massive resources are processed and integrated, high-quality learning materials can be processed at a lower cost, further enriching the choice of college students. Therefore, the learning sharing concept is in line with current college students' demand for precise learning resources, and it also has real market needs. On the basis of this platform, a database management system that can independently manage learning materials is also essential.

3. Overall design
This system is based on the existing offline and online database of "Muzi Shuzhai", which is a learning material management system designed in accordance with the principles of the database. It also has a simple WeChat terminal interface to ensure the convenience of WeChat access system and improve the compatibility of the system. Among them, the overall structure of the database's learning material management system uses B/S Structure, including data query module and data purchase module, as shown in Figure 1:

![Figure 1 overall system diagram](image)

The following is a design of the overall system from both hardware and software aspects.

4. System Design

4.1. Hardware design
The expected result of the learning materials management system designed in this paper is to improve the overall integrity of the learning materials to improve the practicality of the management system. Scan the two-dimensional code generated by the user's WeChat public platform through a specific device, and obtain identity information and demand information according to the registration information of the fracture of the waist, and complete the recording of the information data.

This process mainly depends on the RFID reader, and it is mainly studied in detail in the hardware design. In the system design of this paper, the UHF 2dBi ceramic antenna reader-writer integrated machine, model FD-604, is shown in Figure 2. It comes with RS232 interface, a set of triggers, a set of relay outputs, a reading distance of 2m, a built-in circularly polarized high-performance ceramic antenna, compatible with international and domestic multi-protocol standards, such as ISOT6 can be set to three readings when reading cards Card mode: regular automatic card reading, external trigger control card reading, command interactive card reading, the average card reading speed is less than 6ms per 64bits, and a built-in buzzer as a card reading prompt. The working frequency is ISM865~868MHz, the RF power is 14dBm, and the power supply is DC+12V DC power supply (with
power adapter). With RFID reader as hardware support, it can scan and scan QR code to realize more complete collection and reading of user and learning materials.

![Figure 2 RFID reader UHF integrated machine](image)

**Figure 2** RFID reader UHF integrated machine

4.2. Software design

*Establish information data management database*

The information data management library is one of the important components of the book lending management system. Its function is to classify and manage massive user information and book information, and it can be accessed at any time when the administrator needs certain data. First, establish an abstract E-R data model, which includes user information, book information, library management and other modules, and can describe the real-world conceptual model. The resulting E-R model is shown in Figure 3.

Generate a book borrowing information table based on the information of the model, and use SQL language to establish an information data management database. During this period, the data generation of borrowing date borrow is defined: "borrowData" date DEFAULT NULL COMMENT "borrowing date", for book information Borrow data generation is defined: "bookid" int (11) DEFASTRY NULL COMMENT "book information", in accordance with the order in order to write the program code for each item in the model.

![Figure 3 E-R model of information management](image)

**Figure 3** E-R model of information management

Generally, to manage and classify this information, it needs to be expressed in matrix form:
Suppose that the type of n system information is set \( S = \{ S_1, S_2, \ldots, S_n \} \), select m borrowing information and record it as set \( B = \{ b_1, b_2, \ldots, b_m \} \) when user data \( data_{ij} \) (Indicates the i-th system information and the j-th loan data), then record the result \( I = f(W) \), where \( W = \{ w_1, w_2, \ldots, w_m \} \), representing the management weight coefficient of each information, so that it can make a huge amount of information is sorted and classified under the function of the function.

The learning material data management database established by this system is more flexible in operation. Using SQL language can provide a large number of data access methods. The established database can also reflect the potential connection relationship between information, effectively reducing duplicate information for future The staggered classification and continuous development of learning materials among major universities provide a solid foundation.

5. API management interface design

The API management interface used by the WeChat public platform is an interactive tool that provides users with information management. After obtaining the API management authority, the user sends parameters: signature, timestamp, nonce, echostr to the URL of the library system through the platform server Among. After the server receives the API request, the 4 parameters provided are verified. If the request is indeed judged by the parameter signature, the request really originates from the platform server, and the intervention is considered successful and returned to the echostr parameter; otherwise, it is determined that this time Request intervention failed. In order to improve the security of the API management interface and ensure that information is not lost during the management process to ensure the integrity of the information, it needs to be encrypted by calculation:

\[
C_i^+ = T_i^0 \cdot \frac{1}{\sqrt{2}} / (C_i - A_i \beta_0), \quad i = 1, 2, \ldots, n
\]

Among them: \( i \) represents the correlation coefficient of information; \( C_i \) represents the encryption parameter of information expressibility; \( A_i \) represents the unity of information encryption; \( \beta \) represents the ambiguity of information data; \( T \) represents the encryption state of data persistence. The encryption function is finally determined as:

\[
C_{th} = \frac{C_i^* P_t}{\beta_0} \cdot m
\]

In the formula: \( P \) is the radio frequency of the hardware RFID reader; \( m \) is the modulation factor. So far, the design of the learning material management system on WeChat has been completed.

6. Outlook

According to the "China Sharing Economy Development Report 2017" released by the National Information Center, in 2016, the number of Chinese people willing to pay for knowledge skyrocketed threefold, and the number of knowledge paying users reached nearly 50 million. As of March 2019,
the estimated overall economic scale of knowledge payment is about 10-15 billion yuan, and the demand for this system by these people is also increasing. The number of college students in my country exceeds 30 million, and the huge user group has created a market size that is highly anticipated, but this market is still very imperfect, mainly reflected in:

1. There are many university courses, the characteristics of customized demand are obvious, the market is fragmented, and the matching of resources is insufficient.
2. Online course resources are passive sales, lack of active marketing for specific offline application scenarios, Therefore, the cost of acquiring customers is higher.
3. The online course resource charges are relatively high, which cannot solve the mild demand.
4. Curriculum resources are mainly concentrated in K12, foreign language training, postgraduate examination stage, and university stage courses Process resources are relatively few.

After combining the existing online and offline resources of Muzi Study, this system can better avoid the above problems, and quickly implement the interactive process of learning material transmission and learning material collection with the help of the independently designed WeChat terminal interface. The system can achieve independent growth well, and spread well in various colleges and universities.

7. Summary
The advancement of Internet technology and hardware equipment has promoted the vigorous development of online education, bringing a new wave of knowledge creation, sharing, education and learning, and business opportunities around the realization of knowledge. According to the NetEco "Unicorn" database: As of the end of 2018, there were 11 "unicorns" in China's online education field, with a total valuation of US$16.95 billion. There are four online English and four online tutors, and the remaining three are online translation, comprehensive education and adult education. They use Internet technology to break the time and space restrictions of education, create more application scenarios for online learning, and give education a new meaning of the times. The learning material management system designed in this article is to use database knowledge. The online education institutions in this category have provided new data management ideas, and proposed a leading direction for the information interaction system in the development of online education in the future.

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