PHP-based undergraduate data reporting and teaching quality evaluation information system

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Abstract. Teaching evaluation is an important means to evaluate the quality of university education. The traditional teaching evaluation process requires a lot of manpower and material resources to uniformly allocate resources with inconsistent data storage methods. Therefore, it is of great significance to develop a teaching evaluation system for data management and display. The system adopts the PHP development language, the mature oneThink development framework, the data management method is used to process the data, the data is stored in the MySQL database, and the MVC software design architecture and B/S mode are used for the front-end and server interaction. This article describes the key steps of the development system, and proved in practice that the system is stable and compatible with different operating systems and browsers. The results show that this system simplifies the process of teaching evaluation, improves the efficiency of university educational affairs, and has positive significance for the improvement of university teaching quality.

1. Introduction
Education quality is the core of national education reform and development, and evaluation is an important means to test education quality. The evaluation is a complex and systematic project, which needs a set of scientific, objective, standard and operational evaluation system [1]. Faced with such a huge scale, the traditional teaching evaluation information exchange cost is high and cannot guarantee the simultaneous improvement of the quality of inspection teaching [2]. Therefore, colleges and universities need to upgrade the existing management and teaching methods through a network in the education reform.

In response to the above problems, a PHP-based undergraduate data reporting and teaching quality evaluation information platform was designed. At present, most domestic universities have basically realized the informatization of teaching and educational administration. However, the data sources of these systems are messy and difficult to analyse and use effectively. This system collects and organizes data, and different users correspond to different functional modules, so that the public and college teachers and students can better understand the basic state of teaching.

In order to realize the system, the data management part uses the method of data management, uses MySQL to store data, the programming language uses PHP, the business logic uses the oneThink
framework to realize, the server uses the layered design pattern of MVC. This system has been used in the school's educational evaluation process, and it operates stably.

2. Overall Design
Teaching quality assurance and evaluation system is a tool for collecting and displaying data. The system meets the needs of different users and has powerful data collection, analysis, statistics and display functions. Because this system is not an open-source tool, not any account can log in. After logging in, the administrator can authorize users, and users other than the administrator correspond to different functional modules. System design is divided into system frame design and function design.

2.1. System Architecture Design
Regarding website development, it is often required to use an architecture that can save development time and facilitate maintenance, and the user interface should be friendly and easy to operate. This project uses a B/S-based architecture, and the front-end uses traditional HTML combined with JavaScript developed pages, and adopts an MVC architecture [3]. The background logic development uses the php language to ensure rapid development. At the same time, MySQL is used as the data storage system, and then the project is deployed in the apache project. A new php framework, OneThink framework, is also used, which further encapsulates ThinkPHP, which can facilitate the development of B/S architecture systems, so that when using various tools, accessing databases, and rendering front-end data It can be implemented quickly, thereby shielding a lot of tedious operations, saving development time, and conducive to focusing on business logic and getting rid of technical details. About the specific flow chart of the architecture. See Figure 1 for details:

![Figure 1. System access process diagram of undergraduate teaching quality evaluation information platform.]

2.2. Feature Design
There can be four types of users in this system, namely: school-level administrator users, administrative unit users, college users, and professional users. Only users authorized by the school-level administrator user can log in. All four types of users must enter the system login module first. After the password verification is passed, the corresponding functional modules can be viewed. Of course, the system login module also has the function of modifying the password. School-level administrator users can access all modules of the system, including: system login, status database, professional evaluation index system and user information management. The other three user types can only access the corresponding functional modules, which are equivalent to ordinary users. The specific functional modules corresponding to different types can be accessed. See Figure 2 for details:
3. Concrete Realization

In response to the system's architecture and functional requirements, many necessary functions and features have been completed in the system, such as data management. Even if data from different sources uses the same sentence, it can be retrieved into the MySQL database. In the process of realizing the system, there are three parts of work: data governance, data storage and development process realization.

3.1. Data Governance

At present, colleges and universities have encountered many problems in data analysis and mining. First, data comes from multiple business systems, and data storage standards are not uniform. Second, there are irregularities such as errors, omissions and missing in the original data input process. Third, there are various forms of data storage, including structured data, unstructured data, and paper data that is not entered into the system. Fourth, the data cleaning process lacks accurate and feasible standards and strategies, and data governance is a long-term and complex task [4].

This system provides a set of feasible solutions for the problems encountered in the work and application of big data in universities. After an in-depth understanding and investigation of the campus business system, a standard data storage model was established. For missing data, use reasonable default values to complete to ensure the standard and consistency of the entire data, and store the data in the data warehouse after standardized operations.

For the problem of data islands formed by the isolation of various business systems, the system implements an automated data classification module, which defines different data reading and analysis operations for different data types. This process is transparent to upper-level users and only provides uniformity to upper-level users. With the addition, deletion, modification, and query interface, system users only need to learn a set of data access operations to connect and enter data for all business systems. The realization principle of this module:

- For structured data stored in a traditional relational database, execute structured query language SQL code to read the data. Among them, static data with low security requirements is directly read from the database. For daily operating data and backup data with high security requirements, the intermediate table is used to read indirectly. For sensitive data and data with confidentiality requirements, the view is used to constrain the data query, and the 64-bit key chain is used for encryption during data transmission;
- For the electronic data stored in EXCEL, use the excel manipulation function provided by the ThinkPHP framework to read and parse, and use the defined data storage model for standardized conversion and then store it in the data warehouse;
- For the semi-structured data stored in the network platform using json, xml, etc. because there is no unified standard, the system has done a lot of work on the establishment and constraints of the semi-structured model to ensure that the system can parse the semi-structured normally data;
- For unstructured data such as logs and multimedia files, machine learning is used to train a neural network model for text classification to automatically parse log data, and extract key features related to teaching behaviour and student learning behaviour in the text;
- For paper data that is not entered into the business system, provide data entry and standardized interfaces;

3.2. Data Storage
In order to be able to assign different permissions to different users and display different pages, the database table design is that each user will have a corresponding uq_common_user_type field, which is used to define the type of user and will be associated with a certain user at the same time for accessible menus, a hide field is designed in the table. If the corresponding user does not have the permission to access the page, the value of this field is set to 0, and the user will not be able to see the interface, thus realizing permission control. When a user logs in, different data will be displayed when entering the page. In this way, users can be divided into multiple different types of users, and different users have different permissions and different operations, realizing multi-level system management functions. It can also improve the efficiency of system dynamic development. When the system needs to add, delete or modify system functions, it only needs to change the data in the data table, instead of modifying the content on the page, so as to dynamically manage the functions of the front page. See Figure 3 for details:

Figure 3. Association between data tables.
3.3. Specific Implementation Process

In order to make the system development process clear, low complexity, and high system portability and maintainability after the development is completed, the development implementation process adopts the most classic process model, which is divided into five parts: client, API interface layer, and architecture Module, data storage and operating environment. The system is divided into multiple modules to form a loose coupling between each module. Each module is divided separately, and the divided functional modules are mapped to an object. It conforms to the object-oriented development principle. See Figure 3 for details.

On the client side, it is realized that when authorized users access the system, they can use the mobile phone, PC and API calls of other systems to obtain services.

The API interface layer is used to complete the API gateway to provide a unified interface for the client. Through the use of the gateway to make certain restrictions on external access, including ip authentication, permission control, etc. On the one hand, it integrates the external access method of the system, on the other hand, it improves the security and reliability of the system user login module.

The architecture module realizes that this system mainly provides six basic functions, mainly introduces the realization of two of them. The first one, the realization process of the user management function is when the user clicks on the user login interface of the view layer, the view layer calls the controller After accepting the user's request, the controller will hand it over to the business layer to query the data in the MySQL database. If the user exists in the database, the user's information will be fed back to the controller according to the user's permission control field, and the controller will notify the view layer to perform the corresponding user Page jump. This process is a typical use of the MVC pattern, which reduces the complexity of the architecture design, and improves the flexibility and reusability of the code [5]. Second, the system log function mainly records two types, user behavior log and system operation log. The user behavior log is used to record various user operations and provide data support for subsequent administrators to analyze whether various user operations are appropriate. The system operation log records the internal behavior of the program during the operation. Once the program operation has problems, the program can be solved and restored by analyzing the relevant internal logs. At the same time, it can also gain insight into the logic problems of the program operation.

The data storage module uses a relational database and a distributed database combined with each other. The relational database is used for real-time interaction with users and is used to store data that requires high response time, while the distributed database is used to store large-scale, non-Real-time data, it is used as a data warehouse.

Regarding the project deployment environment, this system has a variety of deployment methods. The first is that it can be deployed in a virtualized environment. In addition, when the user scale reaches a certain level, it can be considered to be deployed on the cloud platforms of various vendors. In order to achieve the purpose of load balancing. Finally, if you consider security reasons, you can also deploy the system in a separate server.
4. Conclusion
In this article, a data reporting and teaching quality evaluation system is implemented using PHP and related technologies. The data warehouse of the system stores structured data that has been cleaned strictly in accordance with the data storage model, which provides a powerful underlying data support for future education data analysis, data mining, learning behavior prediction, and learning route recommendation. The system effectively improves and optimizes all aspects of data management, improves the deficiencies of daily educational administration, improves the school's level of data management, and simplifies the daily educational work process. In addition, the system is already in use, and other related details can be maintained in the future. Nevertheless, this system has room for further development. For example, the data is displayed in tabular form instead of more intuitive images.

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