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Application of Laboratory Data Decision Management System

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Abstract: With the rapid development of big data information technology and the in-depth application of network technology, information management has been widely used in the management of colleges and universities. The experimental teaching mode of colleges and universities has been transformed from traditional experience teaching and computer-aided teaching to data-driven teaching mode. On the basis of the original computer laboratory management system, it extends the personalized service functions such as intelligent access control, computer management, laboratory opening and booking, experimental arrangement management, experimental equipment management, experimental data management, attendance management, system management and basic data management. By collecting, storing and analyzing relevant data, a data decision subsystem is established. Data contains a lot of valuable information, which can provide guidance for experimental teaching and teacher teaching, improve the efficiency of experimental teaching, and better serve teachers and students. The purpose of the research and analysis of this system is to solve the problems existing in the traditional management mode, through information management can effectively improve the utilization rate of experimental instruments and equipment; It can reduce the working intensity of the experimentalists and improve the management efficiency. Through research and analysis, determine the system structure including business analysis, functional analysis and data analysis. In the process of business analysis, the original business process analysis and business process optimization analysis are adopted to provide powerful data support for the management of computer experiment teaching in colleges and universities.

Keywords: Big Data, Laboratory Management System, Personalized Service Function

1. Introduction

With the continuous development of education informationization and application of big data in the field for higher education popularization, big data analyzing is the application for the student basis information data, learning behavior data, teachers teaching conditions data, etc., with the analysis of relevant data, for education mode and education decisions of colleges and universities to provide reliable and reasonable, scientific and effective data support, at the same time, the construction and application of laboratory management in colleges and universities to provide effective reference data [1]. With the continuous progress of educational informatization strategy, the informatization environment of various colleges and universities has been rapidly improved, and various new technologies such as mobile APP learning platforms, digital terminals and wearable devices have gradually become popular in colleges and primary and secondary schools. The normalized application of digital technology provides favorable conditions for the generation of big data in education. With the continuous accumulation and in-depth mining of educational data, the role of big data in constructing new teaching ecology, facilitating the reform of teaching structure and reengineering of teaching process has become increasingly prominent. The paradigm transformation from traditional experience imitation teaching and computer-assisted teaching to data-driven teaching is taking place [2-5].

The recent surge in big data is inevitable. In order to make

effective use of the vast amount of data that is constantly being created, managers face the daunting task of having to convert that data into useful information. No matter from the perspective of practice or research, more and more attention is paid to actionable knowledge. A sound knowledge creation framework can help managers and researchers transform big data into useful knowledge. This paper will summarize rules and characteristics from actual teaching experience data to provide guiding data for laboratory management and experimental teaching [6-8].

At present, big data is developing rapidly. There is a lot of valuable information behind the massive data. The processed information can provide guidance for production and life. Hebei agricultural university computer experimental teaching center, successively in the east and west campus deployment and implementation of the laboratory management system (LMS), in addition to realize remote management functions such as across campus, to access and use the computer is also a certain accumulation of data, combined with the curriculum in the educational system and teachers' information, centers on the idea of big data, computer lab operation data analyzed this semester, and accordingly puts forward relevant Suggestions on the development of the computer experiment teaching center in the future. This paper makes use of the "big data" gathered in the database and conducts analysis from different perspectives to organize data analysis in representative time periods (taking monthly and weekly computer volume as analysis objects). Data collection and analysis are the overall operation data of the computer center in this semester [9-12].

Computer experimental teaching center has become a comprehensive teaching base with experimental and practical functions ("double reality"teaching base), which is an important practice platform for our school to carry out innovation and entrepreneurship education, guide students' innovative thinking, and promote students' independent entrepreneurship. Computer center of the work has already been not limited to the traditional computer teaching, in addition to the daily teaching work, the computer experimental center also carries a number of important experiment and training tasks, such as to undertake various types of multistage other countries grade examination, intramural paperless online examination, subject contests, open computer, training teachers and students, campus visits, and a variety of teaching activities, etc., and the daily teaching tasks of service people occupies more than one 5 of the whole [13-16].

2. Problems Existing in the Laboratory Management System

At present, many business software functions in colleges and universities lag behind, and the same department USES different systems of multiple software vendors. The operation mode and data of these systems belong to different software, which reduces the work efficiency of users and increases the use cost.

Generally, the systems provided by software vendors are general systems, and it is not easy to satisfy the personalized services of various colleges and universities;

Colleges and universities will face long development cycle and high cost when developing new systems based on the original systems.

3. Design of Data Decision Function Laboratory Management System

This system collects, stores and analyzes a large amount of teaching data accumulated during the operation of the system, providing guiding basis for future laboratory construction and course construction.

The college computer experimental teaching management system with data decision-making function includes the following parts (figure 1).

(1) Data acquisition module, which is used to collect various teaching data accumulated in the operation of the system, including course data, teacher information, student information, computer information, access control card information, etc.

(2) User access interface module for system user input analysis conditions.

(3) The data decision module, including the receiving unit, sending unit and decision-making unit, used for the analysis of receiving system user input conditions, send conditions described in the analysis to the database, access to meet the conditions described in the analysis of the data, and described the first data for data analysis and decision making, generate the first decision data, among them, the described decision module and described in the user data access interface module through wired or wireless connection.

(4) The database is used to store the teaching data collected by the data acquisition module and to send the first data meeting the analysis conditions to the data decision module. The database is connected with the data decision module.

(5) The information transfer module is used to transfer the teaching data collected by the data acquisition module to the database.

(6) Basic information setting module, which is used to set up the basic information including college, teachers, classes and students, and establish the unified basic data of all schools and departments in the school. The output end of the basic information setting module is connected with the database.

(7) System user management module, which is used to manage the account, role, authority and other information of system users. The output end of the system user management module is connected with the database.

(8) The authentication module is used to retrieve the corresponding access rights of system users from the database according to the identification code input by the user terminal.

(9) Intelligent access control management module is used to identify the identity of passers, collect the status of each gate area of the laboratory in real time, realize alarm in abnormal circumstances, and control the opening and closing of the electrical lock of the laboratory.

(10) Asset management module, which is used to manage laboratory equipment and low-value goods and consumables, and the output end of the asset management module is connected with the database.

(11) Laboratory information management module, which is used to manage the basic affairs of the laboratory, including the laboratory, experiment rooms, experimental rooms, experimental personnel team, award-winning results, and laboratory construction.

The receiving unit is connected with the output end of the user access interface module and the database, the sending unit is connected with the database, and the decision making unit is connected with the receiving unit. The intelligent access control management module sends the identity information and access records of passers to the database.

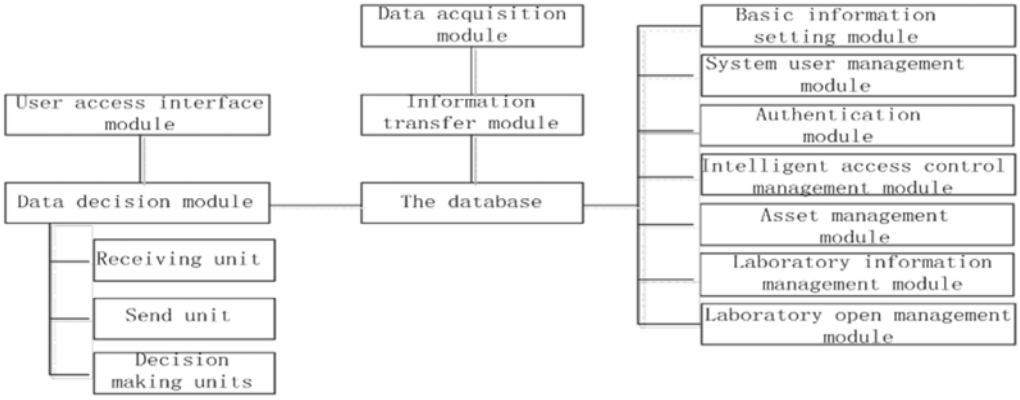

Figure 1. *Computer experimental teaching management system with data decision-making function.*

4. Computer Center Laboratory Management System Case Analysis

The whole laboratory management platform relies on the campus network and is based on the core business process and important management affairs used by the school laboratory. It builds an information management platform from the construction of the laboratory portal website, the basic information management of the laboratory to the opening, innovative experimental teaching, equipment, instruments and supplies.

The information management platform is composed of several subsystems, such as laboratory portal system, laboratory comprehensive management system, open laboratory management system, laboratory instrument and equipment management system, laboratory supplies and consumables management system, and laboratory monitoring system. The personalized service system of data decision function is shown in figure 2, which is used to help users of each network terminal device in the open laboratory reservation system to conduct reservation operation and/or management of the open laboratory through the network.

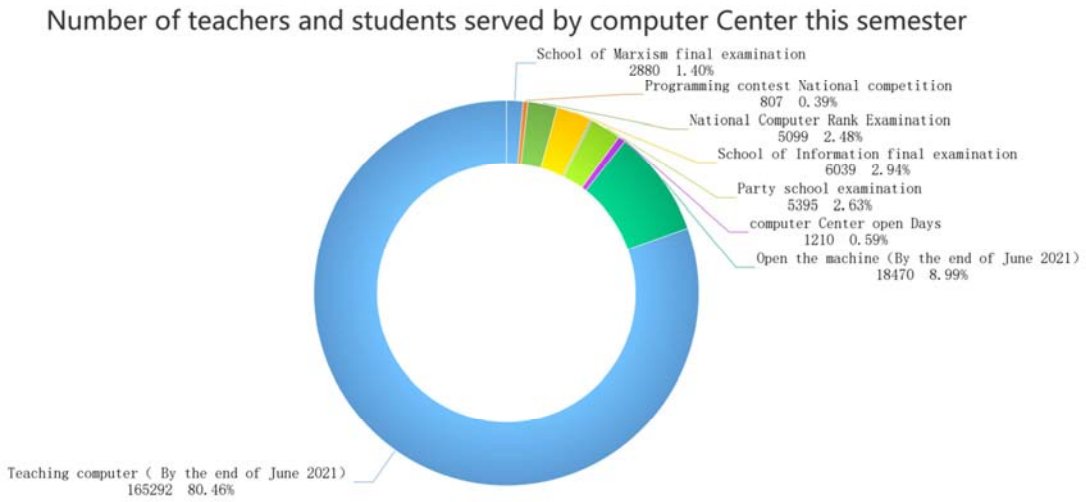

Figure 2. *Number of students and students served by the computer center this semester.*

Through the accumulation of a large number of teaching work in the operation of the system data, including curriculum, teacher information and student information data, computer information, entrance guard card information, etc., to import the data to the decision system, the data according to the customer the need for effective treatment, according to predefined various indicators, interactive and visual data display, to provide guidance for the laboratory construction and the curriculum construction in the future.

This website integrates such functions as computer reservation, intelligent access control, laboratory monitoring and data decision-making subsystem, and the function diagram is shown in figure 2 and figure 3.

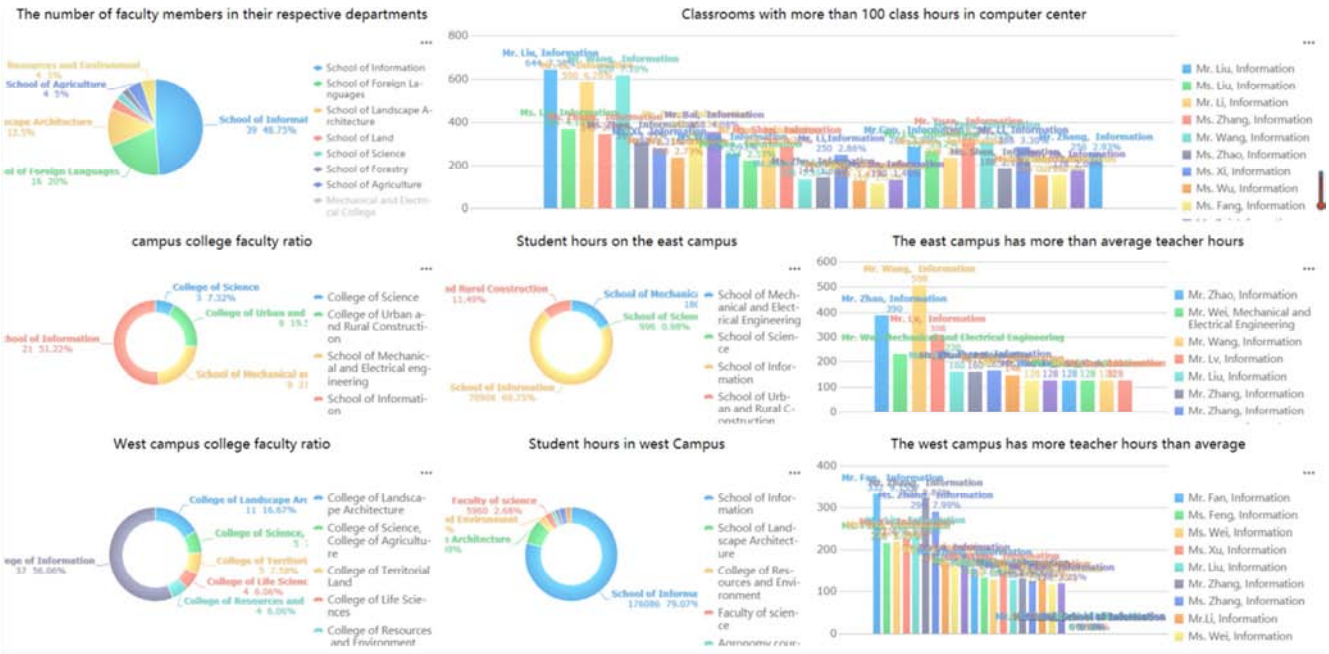

Figure 3. *Operation data construction and integration of data decision system page display.*

5. The Beneficial Effects and Advantages of the Data Decision Function Laboratory Management System

Established the data decision-making system, straightened the original business process on the original multiple systems, integrated the related data of different systems, formed the intermediate database, analyzed the data, and intuitively displayed the overall operation of the department, which was more in line with the data-based decision-making management mode.

Realize integrated services for docking of different systems. By integrating the businesses of multiple systems on the same page and unifying identity authentication, simplify the business process that can only be realized by logging into different systems.

The open laboratory reservation system has a good system function of openness, expansibility and perfection, which can fully meet the needs of managing a large amount of laboratory information; For students, teachers, administrators have provided a universal, friendly, easy to expand the operation interface; Teachers according to the actual teaching situation to make an appointment with the laboratory, view the appointment results; Students make an appointment for the content and time of the experiment and inquire about the teaching arrangement of the laboratory.

In the design of the data decision-making system, the possible situation that teachers reserve laboratories at the same time is also taken into account. The mechanism of avoiding conflicts when making an appointment and resolving conflicts when accepting an application is adopted to make the best efforts to realize the optimal configuration of the decision-making function of laboratory data.

Management system networking, friendly interface, simple operation, powerful function, convenient management, can completely according to user needs, quickly run stably and safely on campus local area network (LAN), can be realized in any campus network is a network node, to the entire school area more than 2000 sets of equipment, 30 the unified management of computer room. And simple operation, has a good use value, improving the quality of teaching.

6. Conclusion

This paper has completed the research and analysis of the experimental teaching management system in colleges and universities, which meets the new requirements of higher education information management. The purpose of the research and analysis of this system is to solve the problems

existing in the traditional management mode, through information management can effectively improve the utilization rate of experimental instruments and equipment; It can reduce the working intensity of the experimentalists and improve the management efficiency. Through research and analysis, determine the system structure including business analysis, functional analysis and data analysis. In the process of business analysis, the original business process analysis and business process optimization analysis are adopted, and the analysis is detailed and specific.

This paper studies and analyzes an information system based on experimental teaching management according to the daily management and teaching requirements of the computer experimental teaching center of Hebei Agricultural University. In order to achieve teaching information resources sharing, daily management and maintenance of experimental equipment management, to improve the efficiency of experimental teaching, and can better serve teachers and students. The research and analysis of this system has certain reference value for similar system research.

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