Research on Network Management of Computer Laboratory Equipment and Experimental Teaching in Colleges and Universities Based on Big Data

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Abstract. Compared with traditional data, big data has the characteristics of unstructured, large amount of data, distribution, visualization and so on. This kind of characteristics can better meet the requirements of personalized teaching in today's era. There are some disadvantages in the traditional computer experiment teaching, and it is an inevitable trend for universities to combine the teaching process with big data. This study discusses the basic situation of traditional computer teaching, the computer teaching mode and its defects under the background of big data, and studies the new computer teaching methods.

Keywords: Computer Laboratory Equipment, Experimental Teaching, Big Data

1. The basic situation of traditional computer experiment teaching

1.1. The limitations of traditional computer teaching

The arrival of the era of big data has a great impact on computer teaching. In the past, the task of computer information processing is not large. However, the information processing in big data era requires technicians to classify information seriously and do a good job in the timely processing of massive information data. The skill of computer software teaching is relatively strong. Teachers need to take students as the teaching subject and understand the learning state of students in teaching activities in order to adjust the teaching direction in time and promote the maximization of teaching efficiency. Especially under the background of big data era, teachers' teaching ideas still stay in the traditional Internet thinking, resulting in students' learning content can not keep up with the pace of the times. The form of computer courseware is too monotonous and the production level is not high enough, which leads to students' obstacles in understanding the information processing methods of big data era.

Some teaching courseware is too gaudy, often focusing on the introduction of the background of big data era, but the introduction of the application effect and development prospect of computer software is not enough, resulting in the lack of connection between the content of students' learning and the specific application of computer teaching. In addition, the existing computer teaching methods are too old and backward, the content of classroom teaching is not vivid enough, without the stimulation of detailed data and vivid picture information, it is difficult for students to accept what
they have learned[1].

1.2. The improvement direction of traditional computer experiment teaching method

1.2.1. Emphasize basic teaching and pay attention to big data's way of dealing with it
In the teaching reform activities of computer major, teachers should focus on the introduction of the information acquisition scheme under big data's technology. Teachers should make students realize the characteristics of network data acquisition under big data's technical background, and understand the working characteristics of sensors and their specific methods of data processing. In the teaching reform activities of computer specialty, teachers should not only pay attention to basic teaching, but also pay attention to the applied teaching of knowledge innovation. In order to ensure that the students' hands-on ability is more purposeful, the students' software hands-on development can also be docked with the enterprise resource development plan, and the software knowledge plate developed by the students can be used in the trial operation of the daily office software operation of the enterprise. Students can tackle key problems from the technical maintenance of information security management and explore a good way to strengthen the security performance of enterprises. In the teaching reform, teachers should let students understand the operation rules of information acquisition, information transmission and information processing.

1.2.2. Cultivate students' practical ability and expand their computer thinking ability
In the teaching reform activities, teachers should also expand students' way of thinking, teach students to use computer data analysis methods to deal with data, use the analytical point of view of applied statistics to train the operation of management information systems. Teachers should also require students to better understand the teaching priorities of information technology courses from the perspective of understanding database principles and application development. And encourage students to use computer thinking to think about problems, and arrange for students to do it themselves.

In the aspect of information transmission, the information transmission technicians under the traditional technology can only use the Internet tools of the computer network to transmit information, the way of information transmission is relatively single, and the interaction is not strong enough. However, in the era of big data technology, technicians can realize data transmission and processing through the docking of information channels of the Internet of things and the Internet. The way of mobile Internet not only improves the interactivity in the process of information transmission, but also enables real-time communication between the transmitter and the acquirer of information. In the aspect of information processing, the traditional technology can only calculate, analyze and process the information of the fixed plate. Depending on the fine algorithm, it needs to grab and compare the individual information in order to complete the information processing.

1.2.3. Carry out the teaching of data comparative analysis
In the process of computer professional teaching reform, teachers should make a comparative analysis of traditional technology and big data technology, and then guide students to learn. In the teaching activities, let the students master the processing characteristics of the fine algorithms in the traditional technology, and lay the foundation for the students to understand the large-scale parallel processing methods of big data technology. Teachers can use the method of comparative analysis to let students understand the working principle of parallel processing method from the differences between two different data processing methods under the same data scale. In order to give students a deeper understanding of the characteristics of big data's processing technology, teachers should also use hands from two aspects of information storage and information display to let students learn the characteristics of the latest big data storage technology and visual data information processing scheme. In the process of teaching reform, computer teaching should keep abreast of the pulse of the times.
2. The use mode of big data in computer experiment

[Diagram: Comparison between traditional model and big data model]

Figure 1. Comparison between traditional model and big data model.

With the improvement of the construction of mobile Internet on campus and the popularity of smartphones, the experimental teaching content feedback system based on mobile WEB can quickly and easily collect students' teaching feedback information to the cloud platform. This can solve the problems encountered in the experiment and innovative ideas without data records, only oral communication. The data types of big data in the experiment include the mastery of knowledge points, problems in theoretical knowledge and problems in practical operation. Compared with the traditional model, big data model has advantages.

According to the collected experimental process data and experimental teaching content feedback data, the horizontal data analysis of the same experimental task of different students was carried out. And the longitudinal data of different experimental tasks of the same student were analyzed, and the fine-grained and quantifiable experimental data were obtained. This can find the problems existing in experimental teaching and learning behavior, dynamically adjust and optimize the content of independent experiments, and realize personalized computer autonomous experiments.

2.1. Design of big data experimental platform

Through big data statistics module, students can get the maximum number of feedback and personal feedback per month, the maximum number of theoretical knowledge feedback and personal feedback in each knowledge unit, and the maximum practical operation problem feedback times and personal feedback times in each knowledge unit.

Teachers log in using PC, and the roles are divided into ordinary teachers and administrators. After logging in, using the user management module, ordinary teachers can view student users and personal information, and administrators can view, add, modify and delete student and teacher information. The administrator has the authority to operate the course management module, which can be used to set up courses, knowledge units, knowledge points and feedback scoring items. Ordinary teachers and administrators have the authority to operate the data management module, which can be used to view the feedback on the mastery of each knowledge point, theoretical knowledge problems and practical operation problems, and add read and like marks and other operations. Ordinary teachers and administrators have the authority to operate the data statistics module, which can be used to view monthly system visits, course feedback times, knowledge sheet feedback times and knowledge point feedback times and so on.

2.2. Teaching Model based on big data

Based on big data's computer teaching reform, the teaching mode is divided into practical learning
and virtual learning\cite{4}. In the link of practical learning, we adopt the mode of face-to-face teaching by teachers, peer-to-peer communication between teachers and students, and increase the training and guidance of practical skills on the basis of theoretical knowledge learning. Through peer-to-peer communication, the classroom content into their own skills, this individual-to-individual interaction, more reflects the knowledge fragments, through further integration, to form a complete knowledge framework.

**Figure 2.** Practical learning mode.

Teachers need to prepare sufficient teaching cases, improve skills operation training, at the same time guide students to carry out rich and effective communication and interaction, timely capture feedback information, and further improve classroom teaching. In the virtual learning link, students complete it with the help of an effective learning system. It includes online courseware, book guide, article cases, online discussion and so on. This link mainly reflects that students acquire knowledge and improve their skills according to their own situation. Make full use of the massive data provided by the Internet for online learning, not only can play a good supplement to the curriculum knowledge, but also can have a clearer understanding of their own mastery, in order to find the right direction. In this link, we need to consider the establishment of an information resource database to cover the whole process of students' learning. In addition to the above, you also need to store test papers, classroom performance, personal information and other data. The system can record the relief, process and results of students' answers in an all-round way, which is convenient for teachers to analyze the students' data. According to the results of the analysis, personalized teaching strategies are worked out to make students make greater progress in mastering knowledge.

3. The malpractice of computer experiment teaching management at present

3.1. The configuration of the experimental environment is low

Database experimental teaching needs an experimental platform, and computer majors usually choose a kind of relational database management software and a kind of database design software as the experimental environment. One of the softwares such as SQL Server and ORACLE is selected as the creation and operation software of the database, and the Power designer software is selected as the design software of the database. Some undergraduate computer majors in some universities choose a lower version of the software. Database management software will launch a new version of the software every few years, adding some new functions\cite{5}.

3.2. The content of the experiment is old-fashioned

The quality of experimental teaching content directly affects the effect of experimental teaching. The teaching materials selected in experimental teaching can be self-compiled or ordered. The version of the database experimental textbook ordered by some schools is too low, the content is obsoleter, or the content of the self-made experimental instruction book is not updated in time. Especially with the arrival of the era of big data, new database applications such as Web search, e-commerce, personalized information services, social networks and other new database applications put forward new requirements for data processing. The existing experimental content no longer meets the application needs of enterprises, and there is a serious disconnection between teaching content and practical application, resulting in the operation that students have learned in school can not be used in undergraduate graduation design development and enterprise software development. it reduces the training quality of computer majors\cite{6}. 


3.3. Lack of curriculum design

The database courses offered by computer majors in some colleges and universities are lack of course design. After the students have finished the experimental class with prescribed class hours, they will complete the experimental task by submitting the internship report, and there is no need for course design. Curriculum design enables students to sort out what they have learned and apply it to practice by allowing students to design and create a database system. Curriculum design is an indispensable teaching link for practical and applied courses.

4. Conclusion

Experimental teaching is an important way to verify, deepen and apply theoretical knowledge, an important link to train high-skilled and innovative computer technical talents, and an important platform to improve the training quality of computer professionals. With the arrival of the era of big data, the experimental teaching of database course for undergraduate computer majors has also been reformed. The experimental teaching reform has stimulated students' interest in learning database courses, improved their database operation skills, and improved the training quality of computer majors. Big data plays a great role in promoting computer teaching in colleges and universities. However, there are still many details to be solved in the flexible application of big data in the field of computer experiment teaching in colleges and universities, which will be a great challenge.

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