Research on the Reform of Laboratory Experimental Teaching of Automotive Majors in Local Undergraduate Institutions Based on Cloud Sharing

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Abstract: The development of network education resource cloud sharing in local undergraduate institutions can take advantage of cloud computing technology to achieve optimal integration and sharing of network automotive professional education resources, reduce resource construction costs, promote uniform distribution of resources, further improve the utilization rate of education resources, and promote the reform of laboratory experimental teaching of automotive majors in local undergraduate institutions. The current situation of laboratory experimental teaching of automotive majors in local undergraduate colleges and universities is analyzed, and the application mode of cloud sharing of educational resources of automotive majors in local undergraduate colleges and universities is discussed.

Keywords: Undergraduate Institutions; Automotive Majors; Cloud Sharing; Teaching Reform.

1. Introduction

Cloud sharing of network education resources mainly refers to the use of cloud computing, an emerging information technology tool, to break through the previous barriers in software and hardware, to break the space-time boundaries between different institutions, to integrate and optimize loose and incomplete education resources, and to realize education resource sharing, which provides a new construction method and application model for sharing network education resources in local undergraduate institutions [1].

With the development of domestic automobile industry, the demand for talents in automobile design, manufacturing, sales and maintenance has increased greatly, and at the same time, the new technology puts forward higher requirements on the knowledge, ability and comprehensive quality of practitioners. The traditional single experimental teaching method is not compatible with the needs of modern automotive industry. It is hoped that the experimental teaching of automotive majors will be reformed through the method of cloud sharing and cloud computing in order to meet the requirements of local undergraduate institutions for talent training. The advantages of applying cloud computing to education to promote the sharing of educational resources in colleges and universities are obvious, and promote the formation of a secure and powerful universal resource sharing platform across regions and systems. By building the construction of digital educational resources sharing in colleges and universities on the basis of cloud computing and services, the heavy work of building sharing platforms, equipping servers, and storing and managing digital educational resources can be handed over to cloud service providers without large-scale hardware investment, or even zero investment, and network centers may disappear. The goal of promoting the integration of digital education resources and strengthening resource sharing in colleges and universities is to build the construction of digital education resources sharing in colleges and universities on the basis of cloud computing and services, which can organize personnel to centralize the construction of digital education resources in colleges and universities by using the collaborative work ability of cloud computing. It can solve the problems of duplicate construction and insufficient information resource sharing, and make the information sharing among colleges and universities become closer and more effective.

2. The current situation of laboratory experimental teaching of automotive majors in local undergraduate colleges and universities

At present, the following problems exist in the experimental teaching of automotive majors in local undergraduate institutions:

First, for a long time, China's higher education has focused on theoretical teaching, paying less attention to practical teaching, and experimental classes are in a subordinate position. Local undergraduate institutions of automotive professional experiments due to the limitations of their own experimental conditions and professional settings are sharing the advantages of the parent school's disciplines, resulting in the content of practical teaching, plans also rely on the parent school, only in the scale and scope of the reduction, there is no essential change. [2]

Second, the local undergraduate institutions in the automotive professional experimental teaching is mainly teacher-oriented, most of the automotive experimental content is cognitive, demonstration experiments, students in the experimental course as an audience, the actual hands-on operation of few, less comprehensive experiments. Cannot give full play to the subjective initiative of students, these are not conducive to the training of students' innovative ability and hands-on ability.

Third, the content of automotive experimental teaching does not form a system, and there are more repetitive experiments. And most of the experimental content focus on deepening the understanding of the theoretical courses of the automotive profession, and there is no focus on cultivating students' ability to analyze problems, innovation, etc. There are no comprehensive experiments such as cross-curriculum

in the content.

Fourthly, the connection between theory and practice is not close, and the laboratory equipment is relatively backward and obsolete. Each experiment is basically to understand the structure, the names of the components and assembly methods, etc., without a good understanding of its working principle. Due to the ageing and obsolescence of the experimental equipment, some data in the experiments are not accurate or cannot be completed properly, and some experimental equipment sets are small. This leads to the inability to stimulate the students' enthusiasm and curiosity in the experiment.

Fifth, theoretical teaching and practical teaching lags behind the development of automobile. This is also a problem faced by all institutions, our theoretical teaching and experimental teaching are lagging behind with the development of the automobile. Students are still at a loss when they graduate and face new technologies.

3. Construction of cloud sharing application mode of educational resources for automotive majors in local undergraduate colleges and universities

The advent of cloud computing era provides a new way for the sharing and integration of educational resources of automotive majors in local undergraduate colleges and universities. The use of cloud computing technology to build an educational information resource sharing and service platform can closely connect local undergraduate colleges and universities distributed in different regions to form an open and high-quality educational resource sharing management system.

3.1. Establishing a standardized cloud sharing library of teaching resources

Teaching resources are the key to education resource sharing, and the cloud sharing mode can provide the construction service of establishing a high-quality teaching resource sharing library, whose construction content mainly includes data standards, usage patterns, data security, etc.

Data standards are the foundation of construction. Establishing unified and standardized teaching resource data standards and interaction interfaces is conducive to local undergraduate institutions combining existing teaching resource libraries with cloud computing technology to build teaching resource libraries in the "private cloud" mode of their own institutions, and at the same time, they can efficiently communicate with the "public cloud" teaching resource libraries of other institutions that are open to the public. At the same time, it can be efficiently interconnected and shared with the "public cloud" teaching resource libraries of other institutions.

The use mode is the application method. Establishing a flexible and efficient teaching resource sharing library resource use mode and using dynamic data services in the cloud sharing environment can enable automotive professional education and teaching staff to participate in the construction, adjustment and updating activities of the teaching resource library independently and flexibly, end users can retrieve various material information conveniently, and learners can build a personalized learning environment according to their actual needs to further improve learning

efficiency.

Data security is the application guarantee. Data security is a prerequisite for cloud sharing of teaching resources for automotive education, and a multi-program emergency maintenance and management mechanism can be established to fully utilize digital signature, data encryption and other technologies for reliable and efficient maintenance and management of teaching resources to ensure data security [3].

3.2. Establishing an efficient cloud computing online learning platform

At present, local undergraduate colleges and universities' distance education is mostly based on internal school network course teaching, with limited learning resources, while the learning objects are mainly students of our university, and some high-quality resources with high quality and good evaluation cannot be oriented to other institutions. The establishment of a large-scale online learning platform for local undergraduate institutions based on cloud computing can make use of the technical advantages of cloud computing, integrate the advantageous resources of each institution, and rely on the huge data computing and processing capacity of cloud computing services to allow large-scale learners to participate in course learning in different ways in different regions, and this scale of simultaneous online learning and information data processing capacity is unmatched by traditional learning platforms. At the same time, learners can also access the cloud sharing platform through mobile devices such as cell phones or tablets to learn and communicate anytime and anywhere, and timely handle and solve the problems encountered in the learning process, thus achieving the purpose of improving learning efficiency [4].

3.3. Establishing a cloud service-based educational software management platform

Software as a service is one of the core ideas of cloud computing. For users of local undergraduate institutions, in addition to common software systems, they also need to install software systems with special functions that meet the needs of automotive professional education and research. Therefore, establishing a software management platform for automotive professional education based on cloud computing services can provide users with a series of online software services, which can form a web-based one-stop information management system and provide solutions for teaching resource management. Some common application software, such as office software, course software and e-mail system, etc., users do not need to install them repeatedly on the local machine, nor do they need to consider whether the software installation and running environment meet their needs, but only generate these functions in the cloud through cloud computing services, and users invoke them by accessing the cloud, so as to reduce maintenance costs without repeatedly building related management systems.

3.4. Establishing a reliable and convenient cloud storage system

Cloud storage has become a trend of future storage system, which provides data storage and business access functions to the outside world jointly by gathering various different types of storage devices in the network to work together through application software through cluster application, network

technology or distributed file system and other functions. By establishing a cloud storage system, the majority of data can be transferred to the cloud storage in each laboratory of automotive experimental teaching in local undergraduate institutions and between different institutions, which greatly reduces the deployment cost of storage systems. At the same time, the key advantage of the cloud storage system is that it can better solve the data security problem. With large-capacity storage space, users can upload and back up their useful data anytime and anywhere without worrying about the lack of storage space. No matter when and where, they can quickly download the data as long as they enter the cloud through their legal identity, effectively avoiding problems such as local data loss and damage.

3.5. Establishing a laboratory resource cloud sharing management platform

As the process of electronic laboratory resources continues to accelerate, the construction of a laboratory resources cloud sharing management platform can provide a more efficient way to share and retrieve laboratory electronic resources. Laboratory "cloud" information resources can be deployed in a hybrid cloud mode, with non-public laboratory data and special databases put into the "private cloud" and opened for the university or specific users. Electronic books and other database information that can be shared by all users can be placed in the "public cloud" to integrate virtual scattered hardware and software resources, thus improving the sharing of information resources and reducing redundancy, so that data resources can be shared among laboratory groups of different institutions [5]. In this application mode, users can freely retrieve and quickly obtain the required resources in the shared cloud platform in the face of the vast information of automotive professional experimental teaching resources.

3.6. Establish a virtual desktop experiment platform based on cloud system

At present, most local undergraduate institutions of automotive professional experimental teaching laboratory infrastructure is still dominated by traditional PC, to carry out different experiments on the computer operation, by the administrator in each PC to install the software programs and clients required for teaching experiments, while important data are scattered on each PC, inconvenient for centralized storage and backup. With the increasing number of computer terminals, managers not only have to maintain the PC hardware, but also the operating system environment, application installation and configuration, as well as desktop management and maintenance, which consumes a lot of manpower and material resources, and data security is not guaranteed. The use of desktop virtualization technology, the establishment of a cloud-based system of virtual desktop laboratory, you can virtualize the user desktop on the basis of physical servers and virtual machine technology, the system used by the user and a variety of teaching applications are shared in the cloud, important data stored in the cloud, in order to achieve the security and flexibility of desktop use, so that the institutions of the automotive professional experimental teaching laboratory terminal management is more flexible It is more convenient to maintain and safer for data.

4. Suggestions for reforming experimental teaching of automotive professional education in local undergraduate institutions

4.1. Update the concept of experimental teaching

At present, the rapid transformation of economic development mode, deep adjustment of industrial structure and rapid growth of real economy put forward new requirements on the scale, quality and structure of talent demand, thus posing new challenges to the ability of higher education to serve economic development, therefore, the reform of higher education is imperative. The economic transformation and upgrading has put forward new requirements for the transformation of colleges and universities. To establish and improve the modern vocational education system, colleges and universities implement the path of staggered development and characteristic schooling. As a new force, local undergraduate colleges and universities have their own special characteristics and cannot copy other schools in the same general way. The orientation of local undergraduate colleges and universities is to cultivate application-oriented talents. At present, according to the needs of education reform, most colleges and universities are carrying out teaching reform, and the idea of reform is to gradually increase the proportion of experimental teaching, so as to cultivate more practical application-oriented talents. Then our automotive profession as a product professional, in the experimental teaching is to be the goal. To adhere to the premise of training at the undergraduate level, more emphasis on the talent "vocational and technical", so that "technology on the level, skills can be on the job, the first line can cover the shift, work can be independent", to pay special attention to the training of students' professional knowledge and vocational skills, to achieve talent To pay special attention to the cultivation of students' professional knowledge and vocational skills, and to realize the seamless connection between the comprehensive quality of talents and the needs of regional economy and industrial development. Explore the innovation of talent training plan, optimize the knowledge structure of talents, and highlight the cultivation of students' design ability, engineering practice ability and innovative thinking ability in automotive engineering. Nowadays, the development of automobiles is becoming more and more intelligent, and as students of automotive majors, they should have basic basic knowledge of automobiles, solid mechanical drawing ability, proficient computer-aided design skills, as well as good humanistic qualities and strong hands-on ability. [6]

In addition, the automotive engineering experimental center can be combined with multi-center such as information engineering experimental center, so that automotive students can rely on the platform of the experimental center to conduct a series of interdisciplinary comprehensive training, such as programming experiments and design of automotive microcontrollers, in order to strengthen the cultivation of students' ability.

4.2. Reform the experimental teaching system of automobile profession

At present, our automobile engineering experiment center has automobile construction laboratory, automobile

disassembly laboratory, automobile electrical laboratory, automobile testing laboratory, automobile simulation laboratory, etc. How can we integrate and share these labs to the cloud sharing platform and build a comprehensive cloud sharing experimental teaching system for automotive majors?

First of all, it is the basic experiment platform of automobile. This is set up for automobile construction, relying on this platform, so that students can master the basic composition of the car and the assembly position of each part, methods and so on. For example, for the course "Automobile Construction", we have conducted a pilot teaching program to move the theoretical teaching from the classroom to the automobile construction laboratory. In the auto construction lab, we have diagrams of auto parts and some new technologies used in current models on the market, and we dissect these parts. Then, during the lecture on "Automotive Construction", we can always relate the current automotive technology used and then explain the theory in the book. From the results of the pilot, this initiative has been very beneficial for students to master automotive construction. Not only did they master the basic theory in the book, but they also learned about the current technology of cars. It is not like the old days when you had to learn about the outdated equipment.

The second is the cloud sharing experiment platform for automotive professionals. This is mainly for the curriculum of automotive electronics technology, automotive testing, automotive maintenance and so on. On the cloud sharing platform, students should be made aware of the testing of automotive electrical appliances, the repair of common faults and the testing of automotive performance such as automotive dynamics and automotive noise. To increase the practical training, through the actual failure phenomenon to teach, so that students know the characterization of the failure phenomenon, to understand the causes of the occurrence of the failure phenomenon and then troubleshooting. In this regard, the Automotive Experimental Center of our college has set up an automotive maintenance and beauty center to organize apprentice classes to repair and test faults through real cars. In the process of this teaching, in addition to teaching students' hands-on skills, students are also strictly required to work in a state where entering the laboratory is entering the workshop, cultivating students' work attitude and work habits. This can largely improve the practical hands-on ability of students, so that students can get out of the school to work. At the same time, it also provides a better guarantee for the transformation and development of the college.

Finally, it is an innovative experiment platform for automobiles. This is set up for cultivating students' innovation and design ability. Here, it is necessary to provide students with a full range of services, so that students can design their own innovative experiments. Innovation is the soul of a nation's progress, is the inexhaustible power of a country's prosperity, human progress is inseparable from innovation, so as a college training student must train students with the spirit of innovation, so that students in the experimental training to discover, to explore the method of innovation. And then organize students to participate in various technical innovation competitions, not only can innovation be put into action, but also can improve the team spirit and innovation spirit of students.

4.3. Reform the experimental teaching content

Automotive technology is constantly developing, and the development of experimental teaching content in automotive should also keep pace with the times. Optimize the knowledge structure of automotive experiments. Those backward experiments should be canceled and changed to experiments that meet the current automotive applications, and some engineering technologies as well as concepts should be implemented into the automotive professional cloud sharing experiments when formulating experiments. According to different experimental platforms, the experimental content should be developed to reflect the automotive experimental teaching system. In the method of experimental teaching, we should change the indoctrination education, and change the "teacher" into "tutor". [7] Encourage students to find out the problems, put forward their views, so that students "will learn". At the same time, we as instructors should learn to make use of various information technologies nowadays to make our laboratory courses more vivid, rather than the old teaching by the book. We have to implement the laboratory is to enter the workshop, and strictly follow the rules to do experiments. In addition, we should prepare some comprehensive experiments and innovative experiments as much as possible. So as to better cultivate students' ability. The focus in the experimental assessment of students should be to test students' mastery of basic knowledge, the ability to operate experimental equipment and the assessment of comprehensive skills. It should be conducted in various forms, such as interviews, practical exercises, etc.

4.4. Implementing open labs

The laboratory should not be a state where classes are open and no classes are closed. We should change the past single teaching method, open the laboratory, increase the experimental teaching time, give students full freedom and space for self-learning through cloud sharing, and reflect the main position of students. Let them bring out their strong desire for knowledge and innovation. Through the opening of the lab, students have improved their independent thinking and skill level. Most of all, it brings out the initiative of students and improves their own quality, which lays a good foundation for working in the future.

4.5. Strengthening laboratory team construction

Laboratory staff has always been regarded as the second line of "teaching assistants" to support teaching, and the prejudice that laboratory work is insignificant has arisen in people's minds. The traditional concept of emphasizing theory and neglecting experiment has seriously affected the construction of laboratory team. In order to adapt to the training of applied talents and strengthen the development of college transformation, we should strengthen the construction of laboratory team, increase the training of dual-teacher, develop incentive mechanism, reasonably develop the training plan of laboratory teachers, improve the skill level and comprehensive quality of laboratory personnel, and let teachers divide into online and offline teaching to meet the desire of students to learn.

Practical education is an important link between theory and practice, and is the key to cultivating new types of applied talents. It has an important role for automotive majors in cultivating talents. Therefore, the reform of the experimental teaching of automotive majors should be oriented to market demand, to improve the comprehensive ability of automotive students through reform, to cultivate high quality talents, and

to explore a new way of teaching automotive in local undergraduate institutions.

Acknowledgements

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