Exploration on the Construction of "Big Data and Cloud Computing" Laboratory in Local Applied Undergraduate Colleges

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Abstract

As an important direction of information technology development, big data and cloud computing have been widely used in business, government, finance, education and other fields. Cloud computing is the technical basis of big data, and big data is an important application of cloud computing. Therefore, more and more colleges and universities offer related courses. But the course of Big Data and Cloud Computing is relatively abstract. If there is no good experimental support, the effect of the course will be discounted. This paper explores how to build "Big Data and Cloud Computing" laboratory in Local Application-oriented Undergraduate Colleges and universities, and gives the corresponding solutions.

Keywords

Big data and cloud computing; Local applied undergraduate colleges and universities; Laboratory construction.

1. Introduction

1.1 Demand for industrial development

Cloud computing and big data technology is a main direction of the development of information technology, which has been widely used in business, government, finance, education and other fields. Cloud computing is the technological foundation of big data, and big data is an important application of cloud computing. Cloud computing is the driving force of big data growth. On the other hand, as more and more data, more and more complex, more and more real-time, this requires cloud computing to process, so the two are mutually reinforcing.

Cloud computing and big data professionals are in great demand, which meets the needs of economic and social development. With the development of Internet, Internet of Things, Mobile Internet, Wearable Devices, Sensing Devices, Cloud Computing, Big Data and other technologies, human society has entered the era of Big Data. The arrival of the era of big data has made "data is assets" a new global consensus, and the development of big data has become a global trend. Big data has subversively changed the global strategic pattern, international security situation, national governance structure and resource allocation model, which has triggered tremendous economic and social changes. The 13th Five-Year Plan for National Economic and Social Development issued by the Central Committee of the Communist Party of China on November 3, 2015 clearly puts forward the implementation of the national big data strategy. Enterprises are more enthusiastic and demanding for new large data analysis and prediction technology talents than traditional business intelligence and information management talents. Innovative talents who master and apply data science and big data technology are scarce resources. Big data is facing a global talent shortage. It is urgent to develop big data industry and train big data talents. In the next few years, the demand for data analysis professionals in China will reach more than hundreds of thousands of people. As an application-oriented demonstration University in Zhejiang Province, it should pay attention to data analysis and application personnel training in the era of big data, integrate basic theory and engineering technology,

export high-level professional talents for the development of big data emerging industries, and ensure the scientific, sustainable and high-speed development of industry. Developing big data industry and training big data talents are the urgent needs of the development of information technology in our province.

The demand of cloud computing and big data technology talents for IT enterprises at home and abroad is growing rapidly. In the next 5 to 10 years, the industry will need a large number of talents who master big data processing technology. In the next 10 years, the number of servers worldwide will increase by 10 times, while the data information managed by enterprise data centers will increase by 50 times, the number of data files to be processed by enterprise data centers will increase by at least 75 times, while the number of IT professionals and technicians worldwide will only increase by 1.5 times. Therefore, there will be a huge gap between the demand for large data processing and application and the number of technical personnel available in the next decade. At present, due to the short time of training cloud computing and big data technology talents in universities at home and abroad, there is a shortage of talents who master the technology of big data processing and application development in the technology market, so the technical talents in this field are very competitive and in short supply. Almost all famous IT enterprises in China, such as Baidu, Tencent, Alibaba, Taobao and Qihu 360, need a large number of cloud computing and big data technology talents.

1.2 Demand for Talents Training

Whether our country can get the first chance in the new round of competition in the era of cloud computing and big data, talent is the key. Faced with such a huge gap in the demand for cloud computing and big data talents, it is urgent to establish cloud computing and big data laboratories to accelerate human training. The establishment of cloud computing and big data laboratory will improve the quality of personnel training in the following aspects.

Improve the environment for talent training. In the College of Electrical Information, the major directly related to this laboratory are Internet of Things Engineering and Computer Application Technology. Because there is no professional cloud computing and big data laboratory, the related cloud computing and big data courses can not be opened, and other majors can not offer relevant elective courses, which affects people. Only to cultivate quality. In the future, we may apply for undergraduate majors such as Data Science and Big Data Technology, Computer Science and Technology. Cloud Computing and Big Data Lab can be an important professional laboratory for these majors.

Improve the experimental conditions of existing courses. The abundant server resources and teaching management software in cloud computing and big data experiments can greatly improve the traditional courses such as Operating System, Database Application Technology, Web Development Technology and Network Programming.

Broaden the platform of innovation and entrepreneurship. Laboratory can promote students to learn advanced scientific and technological knowledge, participate in various competitions related to cloud computing and big data, and cultivate Creativity of students. Provide innovative entrepreneurship education based on big data, train relevant knowledge, ability and accomplishment of applying big data technology to the field of this discipline, and train more comprehensive innovative entrepreneurship talents.

1.3 Needs for Discipline Development

"Control Science and Engineering" is a provincial first-class discipline in our institute. It mainly includes embedded system and automation device, system analysis and optimization control direction, information fusion and intelligent processing. With the wide application of various on-line monitoring automation devices, a large number of monitoring data have been collected. Data mining, fault diagnosis, system analysis and optimization, parallel computing and multi-dimensional data fusion based on these large data are the current research hotspots. However, due to the lack of relevant cloud computing and big data devices, many teachers can not conduct in-depth research. The establishment

of cloud computing and big data laboratory will promote the construction of first-class disciplines, realize the cross-integration of multi-disciplines, broaden the research field, and form a certain characteristic advantage, which will be conducive to the frontier areas of the development of the discipline and produce a number of scientific research achievements with great influence.

1.4 Serving local needs

In the thirteenth five-year plan of provincial first-class disciplines, it is also proposed to actively serve the local areas to support and guide regional economic and social development. Quzhou municipal government is vigorously promoting enterprises to use public cloud for information construction, but also is promoting the construction of e-government cloud, smart city and other information engineering. The establishment of cloud computing and big data laboratory can train information engineering construction and maintenance talents for local enterprises and institutions on the one hand; on the other hand, it can promote teachers to develop information software and big data algorithms for enterprises by using the software and hardware of the laboratory, so as to improve the service ability and application level of teachers for enterprises and institutions; Through the way of school-enterprise cooperation, we should actively carry out research work such as big data, cloud computing and so on, so as to improve scientific research ability.

2. Construction goal

The construction of this laboratory is mainly centered on training students with high-quality technical application talents, making it an important place and carrier for higher education to implement practical teaching activities. According to the requirements of professional teaching, the professional practice teaching is relatively stable, the supporting infrastructure is advanced, the educational, economic and social benefits are exemplary, the management mode and operation mode are normative, and the combination with the synchronization of theoretical teaching and technological development is closely related.

Make the laboratory a teaching laboratory for higher education and training of applied talents. According to the characteristics of higher education, students are required to complete the post-ability training required for employment during the school. The laboratory in the school not only becomes a place for students to master basic professional skills, but also strengthens the organization and design of on-site simulation teaching, providing a practical and practical The skill training space close to the professional post allows the students to pass the simulation training of design, exploration, development, craftsmanship and comprehensiveness under the premise of practical training, so that students will not reach the job position. It is unfamiliar to the environment, the processes, technologies, equipment, production organization management and other issues encountered, thus shortening the post adaptation period. At the same time, it will train and gradually form students to apply the theoretical knowledge to solve practical problems of professional technology application ability, ability to discover, analyze and solve problems, good work quality and professional ethics, and social ability to cooperate and communicate with others. It has the characteristics of being practical and conducive to the cultivation of comprehensive vocational ability.

Make the laboratory a laboratory for research project development. According to the requirements of professional teaching and professional development, as well as the requirements of scientific research, invest in the necessary teaching instruments and equipment, and timely add and update equipment and equipment according to the development of science and technology and technological processes, focusing on continuously improving the modern scientific and technological content of instruments and equipment; At the same time, the advantages of the university's scientific research personnel and advanced experimental equipment will be brought into play, and teachers will be encouraged to participate in technological innovation, technical exchange and technological transformation, and promote the development of scientific research work in the college. On the other hand, through scientific research, teachers also let students get in touch with advanced cloud computing and big data equipment, and cultivate students' scientific research consciousness and innovation consciousness as

soon as possible; through the laboratory open all day, teachers actively participate in scientific research, promote teaching with scientific research, and teach Promote scientific research, form an organic combination of teaching and research, promote each other, and develop harmoniously.

Make the laboratory the center of industry technology, information resources and training. Strengthen cooperation with enterprises and timely feedback of new technologies, new materials and new technologies to practice laboratories, so that practice education can reflect economic development and technological progress in a timely manner, while giving full play to the functions of laboratory high-tech equipment, and opening up to provide skills identification, skill level assessment and labor training for society. Training, project research, product development and other social service functions make it open.

Make the laboratory a multi-functional laboratory that combines teaching, research and production. Give full play to the advantages of people, finances and materials, and open up to the society, cooperate with enterprises, develop technical services for enterprises, develop and test new products, cooperate with enterprise engineering technicians, and research and develop problems encountered in production. And the solution and other means, so that the laboratory gradually formed the conditions of teaching, scientific research, project development and product production in the construction industry, so that it has the characteristics of production, learning and research.

The mutual promotion and development of laboratory practice teaching, scientific research and production. Practice has proved that the combination of production, learning and research can make teaching, scientific research and production interact and promote each other. It is conducive to promoting all-round quality education, emphasizing ability training, fostering innovative spirit and scientific research consciousness, and improving teaching, economic and social benefits of running schools.

Building a social-oriented industry skills training, assessment and appraisal center. In addition to carrying out practical teaching for the students of our college, the practical laboratory should also focus on the society, carry out vocational skills training and appraisal for the society, train applied talents for the needs of economic construction and social development, give full play to the socialization function of the laboratory, and take the socialization of the practical laboratory as an experiment. Room construction is an important goal.

Construction of comprehensive practice teaching laboratory. Focusing on the industry and facing the society, from the aspects of laboratory planning, design, input of equipment and instruments, and the allocation of teachers, and in line with the requirements of high starting point, high standards and wide range of functions, we strive to build the laboratory into a first-class comprehensive practical teaching laboratory in the industry and even in the society, in order to meet the practice of higher education. Under the requirements of sex teaching, we can also carry out various kinds of specialized training for the needs of technical talents in the industry and society, make full use of advanced software and hardware resources, and provide practical teaching services for the industry and society.

3. Functions of Laboratory

Basic functions of teaching and training. To meet the teaching needs of the specialty courses of Internet of Things, Computer Application Technology, Automation, Electrical Engineering and other elective courses, complete the one-to-many skills teaching and training tasks of conventional courses, and complete the single-machine experiment tasks of related courses.

The function of virtual teaching and training specialty. Virtualization is an important feature of cloud computing system. It provides a virtual environment for related applications and research, and realizes rapid deployment of virtual machines.

The experimental functions of large data and cloud computing cluster. To meet the training function of cloud computing, big data and other courses, through simple operation can complete large data and cloud computing related experiments.

Cloud computing, big data related curriculum system construction. Satisfies the related professional cloud computing big data curriculum content, including lectures, experiments, data and so on.

Practical development cases. Specific development cases need to be applied in practice to ensure that students learn what enterprises need and what markets need. Provide business cases for big data analysis in different industries, help students to establish the thinking mode of big data, form the thinking mode of learning the latest big data technology system and effective way of knowledge imparting.

4. Expected results

Fully implement the idea and mode of integration of "production, learning, research and use", pay attention to the cultivation of professional talents and characteristic talents from teaching, practice, scientific research and project production; seamlessly connect to the teaching management system of colleges and universities to meet The school needs more professional needs, can complete the cluster-type big data cloud computing teaching and experiment, and can complete the related requirements of the single machine; use the cloud computing and big data mainstream software framework to build an experimental and scientific research environment that meets the needs of teachers and students of the school, and provide the cloud. Computation and big data teaching and research support environment; apply the cloud computing and big data technology learned in the theoretical course to the actual work and study, improve students' hands-on operation and project practice ability; can learn the talent demand of students and enterprise projects Achieve seamless integration, and closely cooperate with the research work of teachers; in addition to the training of big data technology, you can also use the big data platform to carry out research related to scientific research and practical projects; build a core content and work foundation with big data to innovate The entrepreneurial classroom is the carrier and forms a long-lasting system for training big data talents.

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