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Practical Research on Cloud Computing Skills Competition in Promoting Learning through Competition in Vocational Education

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Abstract: With the rapid development of cloud computing technology, the demand for highly skilled cloud computing talents continues to grow. Vocational education, as the main base for cultivating technical and skilled talents, how to achieve the reform goal of "promoting learning and teaching through competition" through skills competitions has become the focus of current research. Based on the practical case of the cloud computing skills competition, this paper analyzes the mechanism of its role in promoting teaching reform, proposes the implementation path of promoting learning through competition, and explores the innovative model of cloud computing talent cultivation in vocational education through dimensions such as school-enterprise cooperation, curriculum reconstruction, and faculty construction, providing a reference for the high-quality development of vocational education.

Keywords: Cloud computing; Skills competition; Vocational education; Learning through competition

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1. Introduction

With the rapid development of information technology, advanced technologies such as big data, the Internet of Things, and cloud computing are emerging one after another. While promoting industrial transformation, they can also provide new directions for the reform of the training model of computer professionals in vocational colleges. In this context, the skills competition has also shifted from the previous separation of teaching, learning, and practice to a new model that combines promoting teaching, learning, and reform through competition. While deepening school-enterprise cooperation, it promotes the reform of teaching, teaching, and teaching, strengthens the connotation construction, and can also provide better services for regional economic development and help the school construction reach a new level [1]. In addition, cloud computing, as the core infrastructure of the digital economy, has been widely applied in various industries. According to the prediction of the Ministry of Human Resources and Social Security, there will be a shortage of 1.5 million cloud

computing talents in China by 2025, and vocational colleges, as the main supply of skilled talents, urgently need to improve the efficiency of talent cultivation through teaching model reform. Vocational skills competitions, as an important means of vocational education, have become an effective way to promote teaching reform by closely integrating industry standards, technological frontiers, and teaching practice through competition mechanisms[2].

2. The mechanism of the cloud computing skills competition in promoting teaching reform

This type of competition is of a national nature and holds a significant position. It is extremely important and necessary to attach importance to the application and practice of this competition in vocational education [3].

2.1. Promoting learning through competition: Stimulating students' autonomy and innovation ability

Skills competitions stimulate students' practical motivation by simulating real working scenarios and industry demands. For example, the "Cloud Computing Application" event of the Jiangsu Vocational College Skills Competition requires contestants to complete cloud service setup, operation, and maintenance, and development tasks, and integrates cloud-edge-device integration technology to enhance students' comprehensive application ability [4]. During the preparation process, students need to improve their technical proficiency and problem-solving skills through high-intensity project training, forming a virtuous cycle of "learning by doing and doing by learning."

In order to win the competition, students need to understand what cloud computing is and have a preliminary understanding of it. Then, in combination with the competition content, they need to understand the logical relationship between the modules, supplemented by repeated training, allowing them to discuss, communicate, collaborate, and explore related issues to solve practical problems. Such skills competitions are conducive to transforming students' attitudes towards learning from passive acceptance to active completion. In conclusion, "Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime." By taking the competition as an important starting point and instilling the spirit of craftsmanship, it is beneficial for students to further their studies in this skill. At the same time, it can also allow some outstanding students to act as little teachers to drive the progress of other students. While stimulating and continuing students' interest in learning, it can also create a competitive learning atmosphere. It is conducive to achieving the teaching and learning goals of this major [5].

2.2. Promoting teaching through competitions: Optimizing the curriculum system and teaching team

The cloud computing skills competition covers a wide range of knowledge points, such as cutting-edge knowledge of the IT industry. In order to improve students' performance in the skills competition, teachers need to actively learn new ideas and methods so as to keep up with the development pace of the industry, and at the same time master the steps of cloud computing, construction, and architecture, and be familiar with big data-related knowledge. Only when teachers establish the concept of lifelong learning can they provide students with correct guidance and convey more cutting-edge knowledge of the industry, which is an important way to eliminate students' blind mentality in professional learning [6]. In conclusion, teaching and learning promote

each other. With the help of such competitions, it is beneficial to improve the teaching level and quality of teachers. For instance, skills competitions push teaching content to be updated in line with industry trends and enhance the practicality of teaching [7].

2.3. Promoting improvement through competition: Reconstructing the training environment and evaluation system

There are problems, such as outdated equipment and insufficient resources in traditional practical training teaching, while the high standards of practical training conditions in skills competitions prompt institutions to upgrade their hardware facilities. For instance, Jiangxi Vocational College of Applied Technology has introduced enterprise technical experts as coaches and designed practical training projects in line with the "1+X" certificate assessment standards, significantly enhancing students' job adaptability [8]. In addition, the competition, through a diversified evaluation model of "skill operation + on-site defense", breaks the limitations of traditional written tests and comprehensively examines students' technical literacy and innovation ability [9].

At present, technologies such as virtual reality and software-defined networking are emerging one after another, and the teaching of this major cannot meet the demands of the new era (i.e., the cloud computing era). Through this competition, the goals and plans of the major can be clarified, and the pace of reform can be accelerated. In addition, an analysis of the content of this type of competition reveals that it includes the construction of cloud computing infrastructure platforms, the construction of operation and maintenance big data platforms, etc. In order to better cope with the competition, adjustments should be made to the curriculum, such as offering relevant basic courses and giving them vitality through curriculum reform to lay a solid foundation for subsequent reforms [10].

2.4. Promote development through competition: Build a cloud computing laboratory

In traditional laboratories, students are required to conduct experiments and training operations on computers, and these operations are often confined within the laboratory. In the era of cloud computing, it is possible to create a traditional laboratory service model that is free from the constraints of time, space, and services. The laboratory uses server nodes to build a cloud platform, and through pre-configured environment templates, it creates new environments that include multiple hosts and experimental networks in batches and quickly. In this environment, students can log in with a terminal device, and after logging in, they can perform experiments in the cloud host at any time and from anywhere [11]. This type of laboratory has significant advantages, mainly in the following aspects: First, it is conducive to making full use of resources. For the idle host, the resources on the host can be recycled, and the cloud platform can receive these resources and distribute them to other users who need them. Second, it helps to change students' attitudes towards learning and improve their learning efficiency and effectiveness. This type of laboratory breaks through the limitations of time and space, allowing students to conduct experiments and practical training anytime and anywhere, that is, through cloud hosts, to improve their learning outcomes. The third point is that it helps improve the management level of the laboratory. Instead of spending a lot of time creating the environment, cloud computing-related laboratories make templates based on the course environment, then clone and distribute them, and update the environment while also improving the efficiency of administrators [12].

2.5. Promoting cooperation through competition: The impact of cloud computing skills Competition on school-enterprise cooperation

Colleges and enterprises are two separate entities, and this kind of competition serves as a link between them. In fact, vocational colleges lag behind industry technology in terms of teaching content, knowledge update, and teacher structure change. Therefore, they need to rely on the power of enterprises to catch up with the gap and support their development [13]. Such competitions have played a significant role in this, providing references and lessons for vocational education to actively face the market, adhere to the correct direction of running schools, focus on the integration of work and study, and promote the reform of the talent cultivation model and improve the effectiveness of talent cultivation through the cultivation of both morality and skills and the spirit of craftsmanship [14].

3. Practical paths and typical cases of promoting learning through competitions

3.1. Building a teaching platform that integrates industry, education, and competition

Vocational education needs to build a dual-education model of "school-enterprise cooperation + competition-driven." For instance, Amazon Web Services (AWS) and Shenzhen Technician College jointly established a cloud computing training base, providing a cloud experimental platform and industry certification resources. After students passed the SAA (Assistant Solution Architect) and SAP (Expert Solution Architect) certifications, their employability improved significantly by 38%. Nanjing Finance and Economics Vocational School, on the other hand, starts from the lower grades to discover and cultivate potential students by organizing professional interest groups and conducting on-campus competitions. At the same time, it has strengthened exchanges and cooperation with other institutions in competitions, learning from each other, and jointly improving the level of competition [15].

3.2. Reconfigure the modular curriculum system

Based on the requirements of the competition project, vocational colleges can dynamically adjust the course content to a modular structure. For example, a certain vocational college in Shandong has broken down the competition project of the Cloud computing skills competition into modules such as "Cloud platform construction" and "Cloud security operation and maintenance", integrated them into daily teaching, and developed loose-leaf teaching materials to strengthen the application orientation.

3.3. Strengthen the construction of the teaching staff

The ability of the teaching staff directly affects the teaching effect. Vocational colleges can use the "bringing enterprises into teaching" strategy to hire technical experts from enterprises to participate in teaching and encourage teachers to obtain industry certifications (such as Amazon Web Services SAP certification). Shenzhen Technician College has significantly improved its teaching quality through joint training with enterprises.

3.4. Improve the mechanism for the transformation of competition results

The results of the skills competition should be transformed into teaching resources and employment advantages. For instance, Anhui National Defense Science and Technology Vocational College has incorporated the competition preparation experience of its award-winning students into its school-based teaching materials and provided them with high-paying positions through school-enterprise cooperation, ordering classes to achieve a

closed loop of "competition—teaching—employment."

4. Challenges and countermeasures

4.1. Solutions to the problem of insufficient integration of resources

Some institutions are facing a shortage of equipment and funds. They can take advantage of the Ministry of Education's policy on "Construction of Vocational Education Practice Centers" and jointly build and share training bases with enterprises. For example, the Ministry of Education plans to build 300 national-level practice centers by 2025 to promote the optimal allocation of vocational education resources. In addition, the fragmentation of resources could be addressed by building a shared platform. For example, a cloud competition resource center could be established to optimize the allocation and collaboration of various resources, and on this basis, new operational models could be adopted. At the same time, establishing a corresponding points system for resources, based on the competition level and in combination with the training scale, to determine the amount of resources that vocational colleges can apply for, will help improve the efficiency of equipment utilization. In addition, the platform can be used to build a circulation network (which combines enterprises, colleges, and regional centers) so that the relevant products of enterprises can be synchronized with the training environment of schools in the shortest time. The application of the platform helps to shorten the update cycle of training equipment, improve students' access to cutting-edge technologies, and build a new resource ecosystem while addressing the shortage of resources in colleges and universities.

4.2. Strategies for improving the disconnection between teaching and industry

At present, significant progress has been made in the teaching of the cloud computing major, but at the same time, there are some problems that need to be solved urgently, such as the separation of teaching and the industry. Therefore, a three-dimensional linkage improvement mechanism should be established: First, a new curriculum system should be established and combined with the competition, referring to its technical standards, to form a closed loop, that is, first the competition assessment, then the enterprise verification, and finally the teaching transformation. This closed loop puts forward new requirements for the proportion of core course updates and focuses on the absorption of cutting-edge technologies. In practice, by converting the technical points related to the competition assessment, the match between the teaching content and the demands of enterprises will be improved. Secondly, a new system was implemented, namely "dual teachers and three positions", which means that professional teachers undertake three responsibilities, namely teaching, enterprise practice, and competition guidance. The number of enterprise projects that teachers can participate in is clearly stipulated to be no less than 80 class hours. At the same time, the performance assessment method was reformed, that is, the conversion rate of engineering cases was added to enhance the practical ability of teachers. Finally, a new platform was established, which is characterized by the combination of virtual and real, integrating real enterprise projects and creating corresponding databases. On this basis, based on the new training system, students were guided to complete enterprise projects while addressing the disconnection between the two.

4.3. Deepening the development of students' comprehensive qualities

In practice, to cultivate students' comprehensive qualities, a new system of cultivation should be established. This system combines technical skills with professional qualities and achieves the above goals through

dual-track training. In daily teaching, teachers can incorporate elements of the competition, such as scheme design, technical analysis, etc., to build a new training model that combines competition standards, course teaching, etc. Through closed-loop training, it is conducive to achieving the expected goals. Specifically, the indicators for quality assessment should be defined, and when defined, some non-technical types of indicators in the competition, such as document norms, innovative consciousness, etc., can be included. At the same time, organize students for project-based learning and strengthen their development through real project environments, such as communication and expression skills, cooperation skills, and other comprehensive abilities. In addition, a new conversion mechanism can be established to combine students' competition results with quality credits, that is, converting students' rankings into credits, thereby enhancing students' enthusiasm for competition while developing their professional skills and improving their professional qualities.

5. Conclusions

The cloud computing skills competition, through the "competition-teaching-industry" linkage mechanism, provides impetus for reform and practical paths for vocational education. In the future, vocational colleges need to further deepen the integration of industry and education, relying on policy support (such as the Ministry of Education's "11 Key Tasks for Vocational Education"), to build a talent cultivation ecosystem that is "competition-led, school-enterprise collaborative, and resource-open", and provide more high-quality technical and skilled talents for the digital economy era.

Disclosure statement

The author declares no conflict of interest.

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