Thinking and Exploration on the Construction of Network Engineering Major in Application-oriented Universities—Take Lanzhou Institute of Technology as an Example

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Abstract. It is a strategic plan for the long-term development of national education to transform ordinary universities into application-oriented ones, as a newly upgraded network engineering major, how to master the requirements of transformation and development and cultivate application-oriented engineering talents in line with the market demand is the goal and key of education and how to reform the existing professional system to make it more in line with the requirements of talent training and development; and how to adjust the teaching content of the course, grasp the reform of the teaching method centered on arousing the students' enthusiasm for learning; and how to promote the professional teachers to further improve the level of knowledge structure are the thinking and exploration in the process of professional development, hoping to achieve the goal of Engineering application-oriented training of talents under the guidance of national policies.

Introduction

To promote the transformation of undergraduate universities into application-oriented institutions is a major decision of the CPC central committee and the state council and an important part of the supply-side structural reform of talents in the field of education. In the outline of the 13th five-year plan for national economic and social development, it is clearly stated that regular undergraduate colleges and universities with the right conditions should be transformed into application-oriented colleges and universities.

Transformation Requirements of Application-oriented Undergraduate and the Basic Situation of the University

It is clearly proposed to guide colleges and universities to carry out all-round and systematic reforms in terms of governance structure, professional system, curriculum content, teaching methods and faculty structure, etc., indicating the development direction for application-oriented undergraduate colleges and universities [1, 2]. We will support provincial-level pilot colleges and universities in playing an exemplary role, and actively explore reforms in such areas as school-area cooperation, school-enterprise cooperation, faculty development, personnel training programs and curriculum reform, and school governance structure.

The ministry of education should further support the development of application-oriented undergraduate programs. Firstly, it should support the adjustment and optimization of the distribution structure of higher education in different regions, attach more importance to the transformation and construction of application-oriented undergraduate programs in the establishment of colleges and universities, explore the establishment of a classification system of higher education, and promote the diversified and characteristic development of colleges and universities [3]. Second, we will make college enrollment plans more oriented toward talents in urgent need of industrial development, and increase the proportion of application-oriented, skilled
and versatile personnel. The new enrollment plan of higher education is inclined to cultivate application-oriented and technical talents [4]. Third, we will focus on strengthening the experimental and practical training environment, platforms and bases for application-oriented undergraduate programs, encourage the participation of industries and enterprises, and build experimental and practical training facilities that integrate industry and education, school-enterprise cooperation, and industry, university and research [5].

Lanzhou Institute of Technology, formerly known as Lanzhou Technical College, was upgraded to a full-time general undergraduate college in 2012 after being evaluated by the ministry of education and approved by the government of Gansu province. As a provincial pilot unit of application-oriented undergraduate universities in Gansu province, Lanzhou Institute of Technology has been exploring the development of application-oriented undergraduate universities. Based on the actual situation, this paper explores the reform and development of the network engineering major in Lanzhou Institute of Technology in terms of professional system, course content, teaching methods and teacher structure, and tries to find a reasonable foothold in the transformation and development.

Network Engineering Specialty and Existing Problems

Professional Profile

The major of Network Engineering belongs to the college of Computer and Artificial Intelligence of Lanzhou Institute of Technology, and it is one of the first four undergraduate majors of the university. It started to recruit students in September 2012, and till now there have been three graduates. The college of Computer and Artificial Intelligence has four undergraduate programs: Network Engineering, Software Engineering, Digital Media Technology and Intelligent Science and Technology. According to the requirements of the university's orientation of application-oriented undergraduate education, the university should closely meet the needs of local leading industries and strategic emerging industries, and actively cultivate specialized groups with advantages and characteristics that adapt to local needs, so as to improve the fit between professional structure and regional industrial structure. Therefore, the network engineering major attaches’ great importance to strengthening students' ability of engineering application and practice. At present, this major has three employment directions, namely network engineering, network application system development and network management and network security.

During the nearly seven years of teaching, the network engineering major has carried out some teaching reform activities, which are as follows:

(1) Through revising the training program for many times, the connection between training objectives and employment requirements was strengthened. Starting from the first edition of network engineering in 2012, after six years of revision, the current edition of 2018 has added 12 graduation requirements according to the requirements of engineering education certification, each of which matches the training objectives and graduation requirements to cultivate qualified application-oriented engineering talents.

(2) Enhance communication and cooperation between schools and enterprises. In May 2018, the university held the establishment meeting of the school-enterprise cooperation steering committee, during which experts from outside the IT industry were invited to the university to discuss the rationality, feasibility and advancement of the network engineering training program, highlighting the combination of learning and application, learning and innovation, and actively expanding the training channels for application-oriented talents.

(3) To strengthen the cultivation of student's practice, in the first semester to the seventh semester increased cognitive practice, professional practice and network engineering projects such as integrated practice through lectures and other activities, enterprise visit and technicians to make the students understand the current situation and content, enterprise work step by step to deepen the understanding of professional, to enhance students' interest in active learning professional knowledge and power.
(4) From the beginning of the seventh semester, students who are ready to work will be encouraged to take part in pre-job training in excellent enterprises such as "Gansu WanWei," "Shanghai HanDe" and "Sichuan HuaDi," so as to help students move to the "last kilometer" of their jobs.

Existing Problems

After nearly seven years of development, network engineering has made some progress, but there are still some problems in the training process. Firstly, the professional orientation of network engineering is not clear. The 2012-2014 version of the network engineering training program has the problem of more program design and less network engineering courses in the curriculum setting. Because a few years ago the software engineering professional obtain employment situation is good, the market demand, a steady income after students employment, so on the professional orientation focuses on cultivating students' ability of program design and system development, and did not reflect the employment direction is network engineering, network application system development and network management and network security three aspects. Since the college began to recruit undergraduate students in software engineering in 2016, network engineering has faced the problem of employment adjustment and professional orientation redeployment.

Secondly, students lack the ability to learn actively. The present college students' active learning enthusiasm and enthusiasm is not high in our ordinary ii is not uncommon in the colleges and universities, the school has been continuously promote teachers' teaching level, each year by teachers' classroom teaching assessment of race or practice teaching to the teachers' teaching ability, a few years down, all the overall teaching level have a greatly improved. Paradoxically, while teachers prepare their lessons and actively improve their teaching methods, students' learning motivation has not been well improved. Even if the teacher speaks well in class, some students are still absent-minded and inattentive.

Thirdly, the supplement of professional teachers to advanced knowledge still needs to be strengthened. The rapid development of IT industry is inseparable from the strong support of network technology, which has become an indispensable technical support for modern life. Epitaxial technology supported by network, such as machine learning, artificial intelligence is subtly changing our way of life, and is composed of network architecture of network standardization and network protocol at the request of the new technology also continue to achieve new breakthroughs, even revolutionary change, such as Software Defined network (Software Defined Networking, SDN). In the face of diversified professional knowledge structure, if professional teachers do not update the knowledge structure in a timely manner, it is difficult to find the relevance between curriculum training objectives and employment requirements, so that the training requirements are not clear enough.

Finally, school-enterprise cooperation is not strong enough to train talents. Since 2016, the employment orientation of the first batch of undergraduate graduates has been a matter of great concern to university and college leaders. At present, network engineering graduates of the class of 2019, a total of 90 people, including 29 students in the seventh semester, course of permutation way for Gansu Province Ten Thousand D Information Technology Co., Ltd. signed a joint agreement, by the enterprise engineers for agreements to the students in the school to meet the requirements of the enterprise training content, students participate in engineer of theoretical and practical training, the enterprise in accordance with the training required to participate in the inspection, examination pass and sign the employment agreement. It is a reasonable and effective employment method that enterprises participate in school personnel training and adopt the joint training mechanism of "order form." However, Gansu is located in the remote northwest, the economic development is relatively backward, and there are few outstanding local IT enterprises like WanWei, which brings many difficulties to the joint cultivation mode of school-enterprise cooperation.
Improvement Measures

Clear Professional Positioning, Determine the Direction of Employment

Under the applied undergraduate professional network engineering, must grasp the requirements of the applied talents cultivation, on the basis of engineering education accreditation standards, set up to the current situation and learning schools, talent cultivation system, on the curriculum system setting and interlocking engineering application of network engineering talent cultivation, to protect the students' interest in professional, set up perfect course system and content of network engineering, network application development and network security and so on three different employment direction, has a perfect course chain support, each chain include the complete course system theory, in-class experiment and comprehensive practice process. In the comprehensive practice, actively cooperate with off-campus enterprises to explore efficient training content, so that students can skillfully integrate with the market application while completing the on-campus courses. In the talent training program for the class of 2018, we have set up a two-week comprehensive network engineering practice, from LAN configuration experiment to wan simulation experiment in two weeks. From network security experiment to simulation networking and troubleshooting experiment and SDN simple environment configuration and protocol test experiment; Let the students integrate the scattered knowledge into an effective technology whole, broaden the horizon, strengthen the ability to learn new technology. At the same time, to keep the employment direction of network systems development, with strong ability system development of the students, provides a program design basis principle and technology, network programming technology, database and Web application development course, causes the student to be able to more complex network system, front and back design work for the programmer do the full preparation.

Strengthen Students' Awareness of Being the Subject of Learning

The emphasis on teachers' teaching methods has been changed to the emphasis on students' learning methods. Colleges and universities are constantly trying to improve teachers' professional teaching level by means of theoretical teaching competition and practical teaching competition. However, more attention should be paid to students' ability to learn actively. This requires teachers to constantly improve teaching methods at the same time, further thinking about the teaching process and the degree of integration of students, let students really into curriculum content, through the arrangement of preparation before the task each time, clear the classroom to the specific requirements of the teaching content, strengthen the students to preview the quality inspection, supervise and urge students to carry out the preparation task method, change passive to active learning in class, strengthen the students' ability of active learning.

To increase the number of discussion sessions, the teacher determines the discussion group of the students in advance, arranges the content of the discussion session, and the students divide the work among the internal staff again to determine the content of the discussion, supplement extracurricular knowledge, make slides and explain the students. It not only trains students' ability of teamwork, organization and management, but also makes them enrich, diversify and materialize the content of abstract theoretical courses, which deepens students' understanding and mastery of knowledge.

Continue to Strengthen the Construction of the Faculty and Strive to Improve the Professional Teaching Level of Teachers

Teachers should actively learn new knowledge and techniques while doing their own teaching well. The development of IT industry is very rapid, which requires teachers to constantly expand their own knowledge base storage, understand and master the core knowledge and skills of new technology. Teachers are encouraged to take an active part in visiting scholars, course refreshments and next exercises at appropriate times, and strive to improve the theoretical teaching level and practical teaching ability of "double-qualified" teachers, so as to cultivate qualified application-oriented undergraduate talents.
Strengthen the Construction of School-enterprise Cooperation Personnel Training Mode

To actively explore the school-enterprise cooperation model of application-oriented universities, we should not only bring in enterprises but also release students. In 2018, the university signed a school-enterprise cooperation agreement with Beijing Bong-Bang Security Technology Co., Ltd. to further explore new ideas of industry-education integration, school-enterprise collaborative education and scientific research cooperation, jointly optimize and upgrade network professional construction, improve the level of teachers, and jointly promote the reform of application-oriented personnel training mode to a new height. At the same time, the school also with Ten Thousand D Information Technology Co., Ltd, Gansu Hand Enterprise Solutions Co., Ltd. and Chengdu Wiener Software Co., Ltd., and other enterprises to carry on the positive cooperation, exchange and joint training ways, to prepare part of the employment of students understand early enterprise employee needs, with professional skills to adapt to the enterprise working environment in advance.

Conclusion

In the process of transformation from ordinary undergraduate universities to application-oriented undergraduate universities, how to train application-oriented talents in the network engineering major of Lanzhou institute of technology to meet the educational requirements is the key to the smooth transformation of the major. This article from the network engineering professional system development, the curriculum content reform, the teaching method research and strengthens the personnel training mode construction and so on four aspects, analyzed the present existence question and the insufficiency, and proposed the reasonable solution. It is hoped that through the method of theoretical guidance and practice, the network engineering specialty can gradually realize the goal of application-oriented engineering training of talents under the guidance of national policies and the work deployment of schools and colleges, so as to truly integrate talent training with the market.

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