

Practice of Application-oriented Undergraduates Cultivated by School-Enterprise Cooperation under the Guidance of “The Belt and Road” Initiative

-The Case of Chongqing Vocational Institute of Engineering

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Abstract—In order to deepen international exchanges and cooperation and create new regional cooperative relations, China has made a major initiative to build the “Belt and Road”. Education departments should conform to the trend of the times and provide human resources for the construction of the “Belt and Road” national communication network. Students at the junior college level are more prominent in practical operation ability, but they lack the theoretical foundation. In order to cultivate more comprehensive talents, Chongqing Vocational Institute of Engineering reforms actively, explores and trains applied undergraduates with ZTE company together to explore various measures for training applied undergraduates together.

Keywords—The Belt and Road; school-enterprise cooperative education; application-oriented undergraduates; implementation measures

I. INTRODUCTION

On March 28, 2015, the National Development and Reform Commission, Ministry of Foreign Affairs, and Ministry of Commerce jointly published the Vision and Actions to Promote the Joint Construction of Silk Road Economic Belt and the 21st Century of Marine Silk Road. The document pointed out that, the acceleration of “The Belt and Road” construction is good for promoting the economic prosperity and regional economic cooperation of various countries along the line, and it is a noble cause that can benefit people from all countries worldwide. The important task for the communication industry to serve “The Belt and Road” strategy is to improve the international communication interconnection level, and unblock the information silk road.

Our country is now experiencing an important period of economic structure adjustment and the construction of “high-speed and smooth, urban and rural areas coverage, qualified and affordable, and convenient service” broadband network will effectively drive investment demand and information consumption. It can be predicted that, in the next few years, communication industry will usher in a new high-speed development period, but the talent reservation corresponding to industrial increase is not sufficient enough, and the supply gap of professional talents in mobile communication will be further intensified, the mobile communication talent gap predicted by

different research institutes is above a million. In Reference [1], we have deeply analyzed the necessity for holding mobile communication technology specialty applied undergraduate in higher vocational colleges, and this paper will further analyze the feasibility and specific implementation approach of this scheme.

II. FEASIBILITY ANALYSIS ON HOLDING COMMUNICATION ENGINEERING APPLIED UNDERGRADUATE SPECIALTIES

A. The State Energetically Supports Mixed Ownership School-running mode and Perfects Vocational Education System

1) The State Supports the Implementation of Mixed Ownership School-running Mode

The proposal about the mixed ownership school-running mode is an important innovation point and highlight for 2014 National Vocational Education Work Conference and the Decision of the State Council about Accelerating the Development of Modernized Vocational Education. The implementation of mixed ownership school-running mode is an important innovation for the vocational education system in our country. In 2014, the State Council convened the widely concerned National Vocational Education Work Conference, and General Secretary Xi Jinping gave important instructions about accelerating the development of modernized vocational education, and Prime Minister Li Keqiang received all representatives attending the conference, and delivered an important speech about deepening vocational education reform, and the overall spirit of the conference is to make breakthrough through the reform of system and mechanism, build a new environment and expand new approaches for the further development of vocational education, of which one remarkable reform objective is “to explore development shareholding system, mixed ownership vocational college, and permit the participation of school-running with the capital, knowledge, technology, management and other factors and enjoy corresponding rights”.

Higher Vocational Education Innovation Development Action Plan (2015-2018) advocates adopting mixed ownership mode in vocational education and making more social

resources gather towards vocational education. The action plan has made the higher vocational college have profound changes in system and mechanism, and a batch of industrial enterprises will act as the sponsors, to implement the “double-subject school-running” in a real sense, and make the industrial factors penetrate into the bones of higher vocational colleges.

2) *The State supports the Perfection of Vocational Education System*

In 2016, the Ministry of Education pointed out in the notice about Promoting the Joint Construction of “The Belt and Road” Education Plan that: the promotion of jointly constructing “The Belt and Road” had provided a big opportunity for the great opening, great communication and great integration of regional education. Countries along the “The Belt and Road” should reinforce cooperation and joint action, which was not only an important part constituting the joint construction of “The Belt and Road”, but also provided talent support to the joint construction of “The Belt and Road”. The strategic layout of the state has also put forward a higher requirement for the education mode of current vocational colleges.

In the Higher Vocational Education Innovation Development Action Plan (2015-2018), the innovation of modernized vocational education system is regarded as an important task, and it declares that the modernized vocational education system in our country includes the complete panel of secondary vocational school, junior college, undergraduate and engineering master, and indicates that the Chinese higher vocational education layout reconstruction engineering has been opened again. The action plan has deployed the improvement work path of Chinese vocational education from local development to overall development, from individual growth to systematic growth, and from middle and low-end forum to the high-end forum, and this is an important aspect for the transformation upgrading of higher vocational education from incomplete to complete as a kind of higher education type.

B. *The School-enterprise Cooperation Pattern Possess Profound Applied Talent Cultivation School-running Deposits*

1) *Historical Deposits for the Cultivation of Applied Talents in the School*

Chongqing Vocational Institute of Engineering is a full-time normal higher vocational college held by Chongqing Municipal People’s Government and managed by Chongqing Municipal Education Committee. In 2010, the national demonstrative higher vocational college was established. The school has sound teaching facilities, advanced teaching equipment, and all the courses can adopt “cloud” course teaching. It has been filed in the National Ministry of Education, and used to hold Sino-Australian Higher Education Junior College Project Foreign Accounting Specialty with Australian Kangan Batman Institute of TAFE, and established a long-term interschool communication mechanism with America, Canada, British, Australia, Korea and other countries, and carried out activities considering professional cooperation, course identification, vocational qualification certification, teacher cultivation, students’ communication, and education

background improvement, and also carried out overseas student cultivation and technical service with countries along “The Belt and Road”, such as Malaysia, Laos, Uzbekistan, and the Republic of Belarus.

2) *ZTE Communications Co., Ltd. Possesses Rich School-enterprise Cooperated School-running Experience*

ZTE Corporation has long-term school-enterprise cooperated school-running experience, and has accumulated rich experience in school-enterprise cooperated talent cultivation. In December, 2014, ZTE Corporation and the Ministry of Education signed the cooperation framework agreement, and jointly established “the Ministry of Education—ZTE Corporation ICT Innovation Base” through school-enterprise cooperation. In December, 2016, the Ministry of Education School Planning Construction Development Center and ZTE Corporation jointly launched “The Belt and Road” Industry-education Integration and Enterprise International Development Forum. The forum held “Silk Road International School” Action Plan Release Ceremony. “The Silk Road International School” is built by Chinese and foreign colleges through cooperation, and takes school-enterprise cooperation as the main mode, and will be into the “union college” that integrates academic education, continuing education, technical application and community service. The international talents requested for Chinese enterprises should be equipped with multi-layer capacity, including the language communication and the basic capacity for living abroad, more importantly, the international vision, local resource integration and professional business capacity, and such international team can help the enterprise realize the implementation and promotion of international strategy.

C. *Possess the School-running Conditions for Holding Communication Engineering Applied Undergraduate Specialties*

1) *International Mixed Ownership School-running Carrier*

The mobile communication technology specialty is the key construction specialty in Chongqing Vocational Institute of Engineering, and also the backbone specialty under construction in Chongqing City. In 2015, Chongqing Vocational Institute of Engineering and ZTE signed the Ministry of Education—ZTE Communication ICT Industry Innovation Base Cooperation Agreement, and the two parties input RMB 10,500,000 under the guidance of the Ministry of Education, and carried out the construction and operation of “ICT industrial innovation base”.

As the management and operation institution for cooperated school-running, ZTE ICT University is affiliated to the lead and management of Chongqing Vocational Institute of Engineering, and adopts the mode of “school-leading, enterprise-dominant, teachers and student participated, and on-campus implementation” to carry out construction and operation. Except for the normal enrollment of domestic students, ZTE ICT University will also enroll overseas students from countries along “The Belt and Road”, and currently, it totally has 19 overseas students from the Republic of Uzbekistan. After graduation, overseas students can be employed at the country of origin, so as to cultivate high qualified local applied technical skill talents for overseas

enterprises in Chinese communication industrial chain, and carry out the new mode of talent cultivation that can have seamless connection with the industry.

2) *School-enterprise Cooperated Mixed Teaching Team*

The teaching teams of ZTE ICT University and International Silk Road School are jointly constituted by the school-enterprise parties, and then form mixed teaching team, mixed office and mixed teaching. The enterprise will assign engineers with several years of rich work experience to permanently stay at school, and then implement management as per enterprise mode, undertake the teaching work focused on professional core course teaching, vocational quality course teaching, and course practice, and the rich industrial work background will make the modernized apprenticeship system talent cultivation mode more feasible.

The teachers assigned by the school to ZTE ICT University possess the characteristics of high academic degree and high title as well as relatively long exercise experience at the enterprise, with not only deep theoretical foundation, but also strong practical capacity. The school teachers and the engineers of ZTE Corporation will jointly carry out the teaching task of professional courses, and conduct management and performance evaluation as per enterprise requirements, and on the basis of completing teaching task, they should be responsible for course construction, technical innovation, excellent students cultivation and other work in the meantime.

The constitution of mixed team can fully play the advantages of school teachers and enterprise engineers respectively, and in the process of joint teaching, they can promote and remedy each other, and make the knowledge learned by students match with the actual demands of the industry, with not only outstanding practical skills, but also certain vocational development potential.

3) *Advanced Practical Training Facilities*

The construction of advanced practical training base is an important assurance for the improvement of vocational education quality. The school is established with the communication engineering talent cultivation and practical training base that can be highly consistent with the working environment of communication industry—ICT industrial innovation base, and the practical training equipment at the base can be kept consistent with the current network equipment of communication operators, and fully represent the full process of communication network planning, design, construction, debugging, maintenance, and optimization, improve the basic understanding of students about the whole network, and comprehensively improve students' practical operation capacity.

Currently, it has established LTE mobile communication, optical communication, telecommunication engineering, cloud calculation, information safety and data communication and other several practical training platforms at ICT industrial innovation base. It can comprehensively cultivate students' actual post capacity about installation debugging, business application, fault processing, and development design, and improve students' vocational adaptability and employment competitiveness.

Through introducing industrial leading technologies into the teaching process, realize the synchronization of college specialty development with the industrial leading technology. By virtue of the aforementioned practical training base environment, Chongqing Vocational Institute of Engineering has been equipped with the conditions for holding Chongqing Municipal (Provincial Level) Vocational College Information Communication Type Skill Competition Events. Meanwhile, the practical training base is also the industrial training center, which can meet the training demand for improving the skills of enterprise employees.

4) *Rich Teaching Resources*

ZTE ICT University has reinforced the cultivation of students' basic capacity, professional capacity, and comprehensive capacity on the school-enterprise cooperation platform, and as per the "three-orientation" course system of course structure modularization, course contents project orientation, and course management standardization, it implements "the four-joint" cultivation mechanism of jointly formulating cultivation schemes with the enterprise, jointly implementing the teaching process, jointly developing professional courses, and jointly erecting student employment service platform, and cultivates communication engineering specialty applied senior technical talents with "solid foundation, strong capacity, innovation and high quality".

As per the course system, ZTE ICT University and the enterprise jointly build and introduce complete set of enterprise training textbooks based on project orientation as well as correspondingly matched teaching resources, and the objective is to cultivate technical skill talents. By virtue of "the shared professional teaching resource library cloud comprehensive platform" of Chongqing Vocational Institute of Engineering, and in combination with the practical training facilities, the mixed teaching team has established lots of teaching resources, such as Micro-course, MOOCs and project case library.

III. IMPLEMENTATION APPROACHES FOR HOLDING COMMUNICATION ENGINEERING APPLIED UNDERGRADUATE SPECIALTIES

A. *Innovate Industry-education Integrated Talent Cultivation Scheme*

The professional design and talent cultivation scheme of ZTE ICT University are confirmed through the joint discussion of the school and the enterprise and will be annually updated; as per the requirements of industrial layout, enterprise development and regional economy, make clear the talent cultivation specification, structure and demand of the university, reflect the practical skill talent cultivation reform under the guidance of school-enterprise cooperation, and integrate the identity of students and employees.

Cooperate with qualified enterprises inside the industry, and realize the vocational education objective of 'enrollment equals to recruitment, and admission equals to employment'. ZTE selects several core enterprises of its own and regional industrial chains to jointly build the student employment resource pool, and during the admission, enterprises can confirm the students' cultivation direction as per the future

development demand of the market, and let students possess two identities of both students and employees during the admission, and implement modernized apprenticeship system talent cultivation mode.

Except for learning knowledge, during the academic years, students should also accept the learning tasks arranged by the enterprise. The human resource department of the enterprise will periodically check the learning task execution conditions, and conduct targeted training as per the learning progress conditions. Periodically arrange students to go to the enterprise for visiting and learning, and meanwhile, accept the practical exercise arranged by the enterprise. During the enterprise training period, students can enjoy apprentice salary, and the salary treatment will be improved with the progress of skills. The practical and graduation design formulated in the talent cultivation scheme are completed within the enterprise, and after the evaluation, they can be employed as the official employee of the company.

B. Innovate "One-class and Double-teacher" Teaching Mode

The mixed teaching team is jointly constituted by professional teachers and the engineers of ZTE, and is jointly managed by the school-enterprise parties. The main core courses and course practice adopt "one-class and double-teacher" system, i.e., each class is jointly guided by professional teachers of the school and the engineers of the enterprise, and professionals should coordinate the work emphasis of these two parties as per the course contents and the actual conditions about the equipped teachers, and fully play the respective advantages of professional teachers and engineers of the enterprise.

Under "one-class and double-teacher" teaching mode, both the theoretical link of professional course and the practical link can obtain qualified teaching assurance, and in the class, especially in practical teaching, students can obtain more timely and comprehensive guidance; meanwhile, the knowledge and skills taught by teachers can also obtain cross-validation and improvement in the teaching process.

C. Innovate "Enterprise, School, Industry" Three-tutor Modernized Apprenticeship System

On the basis of the rich school-enterprise cooperation resources, Chongqing Vocational Institute of Engineering and ZTE ICT University will carry out "enterprise, school and industry" three-tutor modernized apprenticeship system for applied undergraduate based on professional tutor, and academic tutor "double-tutor" system. The specific method is: (1) after the enrollment of cooperated employment enterprises at Chongqing Vocational Institute of Engineering, the pre-employed students will be confirmed, and then each student will be appointed with one independent enterprise tutor, and implement "one-to-one" guidance for students, and the enterprise will evaluate the enterprise tutor as per students' performance, and the student evaluation result will influence the performance of enterprise tutor. (2) As the academic tutor of students, teachers (including those appointed by enterprises) should be respectively responsible for 4-6 students considering the academic guidance from admission to graduation, and

meanwhile, be responsible for contacting correspond enterprise tutors. (3) Hire industrial experts as the professional tutor, and adopt lecture, forum, QQ, official account and other modes, to be responsible for students' professional development guidance.

The most key point for such modernized apprenticeship system is the "one-to-one" guidance of enterprise tutors for students; meanwhile, enterprises should evaluate the guidance conditions. Specific to "one-to-many" and the non-evaluated apprenticeship system of the enterprise, this scheme will largely improve the guidance quality.

D. Innovate Cultural Construction, and Integrate Enterprise Culture and Campus Culture

Establish quasi-professional cultivation system through ZTE Jingshi Education SMART Ruizhi Vocational Planning System; through diversified activities of "enterprises in campus" and other modes, let students understand the industrial, enterprise and post characteristics and demands in advance, and improve vocational quality; implement enterprise-oriented vocational management for students, and pay attention to the integration of campus culture and enterprise culture, and create the social value culture that can influence students and obtain their recognition; through the social value culture evaluation of students, monthly evaluate the students' performance during the learning period at school and the practical training period, promote students to shorten the inadequacy period to work at the industrial posts, and improve students' vocational development competitiveness.

IV. SUMMARY

The development accumulation of Chongqing Vocational Institute of Engineering over the years have provided a solid foundation for opening "The Belt and Road" oriented national applied undergraduate, while the leading technology of ZTE Corporation can also provide technical assurance for the engineering. The various approaches for Chongqing Vocational Institute of Engineering and ZTE Corporation to jointly cultivate applied communication specialty undergraduate are practical and feasible, and the two parties should reinforce cooperation, have in-depth communication and provide talent assurance for the communication industry of our country to go out of the country.

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