

Exploration and Research on the Model of Joint Training of Vocational Undergraduate Students by Vocational Colleges and Universities

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Abstract

With the rapid development of economy, the market has been posing higher and higher requirements for the quality and skill of talents. Thus high-skilled vocational talents are in urgent shortage. Under this background, the vocation-oriented undergraduate education is becoming not only a inevitable trend of the development of modern education, but also a practical option to achieve sustainable development. In this paper, with the needs for industrialization, urbanization and the development of "14+10" industry of Guangxi Province squarely in mind, we take the example of the joint program of water supply and drainage science and engineering between the vocational college and the university as an example to analyze the setting up of training objectives, curriculum system construction, teaching organization and teaching methods of collaborative education between vocational colleges and universities in general. We also explore a new model of joint training program, in the hope to provide new ideas for the joint vocational undergraduate education program.

Keywords

Application-oriented undergraduate, joint training, collaborative education, training model.

1. Introduction

The current vocational education system in China aims mainly at cultivating practical and skilled vocational talents for work process. With the combination of secondary and vocational education, it effectively covers the low-end labor employment positions in the industrial chain. With the surge of the Internet and the coming of the industrial 4.0 era, intelligent services is being integrated in to every industry, which will bring about the ever growing demand for "application-skilled talents". The stable acquisition of these specialized high-end comprehensive human resources has become a key factor for the transformation of China's regional industries.

According to "The Guideline of the National Medium and Long-term Education Reform and Development (2010-2020)", vocational education should expand the scale of training for vocational, compound and skilled talents. Modern education system is based on the sustainable supply of human resources to serve the need of the regional economic growth and industrial upgrading and transformation. A variety of pilot projects for the upgrading of vocational Colleges and undergraduate to application transformation have been carried out, including the transformation of ordinary universities, the upgrading of vocational colleges, the establishment of vocational colleges by ordinary universities, vocational colleges providing undergraduate degree on conditions, and joint program by vocational colleges and universities. It also lays out the relevant problems and implementation of teaching reform practice from a single or all

perspectives of "development positioning, goal convergence, training program, social identity, school-enterprise cooperation" in vocational education.

Combined with the construction and perfection of vocational education system, how to improve the quality of high-end applied skilled talents has become a brand-new topic in the exploration of the joint training model of talents in vocational colleges and universities. It is different from the current transformation of applied skills in universities, and it is also different from the vocational-to-undergraduate program in vocational colleges aiming to attract students and raise employment rate in the past. Current research is carried out mainly from the respective perspectives of the development of vocational college upgrading and vocation-oriented undergraduate education. It presents macro-analysis of the path of vocational undergraduate education and provides a solution in specific area. However, due to the hybridity and unbalanced development of vocational education and higher education system in China, the research on the joint training model has not yet formed an ecological system and it lacks guarantee mechanism. Following the trend of vocational education and the transformation of undergraduate applied skills, in this paper, we takes the joint program of the vocational college and the university as an example to discuss the talent training goal, the innovation of talent mode, the construction of curriculum system, the organization of teaching forms and the measures of school management, and construct the integrated training program for applied-tech vocational talents.

2. Training Objective

The demand for talents in modern society determines the objective of talent cultivation. Talent cultivation can truly realize the social value of talents, and more importantly, ensure the sustainable development of disciplines only on the premise that it constantly meets various practical needs of the society. Therefore, in the light of the needs for industrialization, urbanization and the development of "14+10" industry of Guangxi Province and the characteristics of vocational colleges and universities, we propose that the training objective of high-end application-oriented undergraduate majoring in water supply and drainage science and engineering be as follows: training high-end application-oriented engineers prepared in water supply and drainage engineering, water environment monitoring, water pollution, energy conservation, environmental protection and other related fields, who can design, construct, research and manage water supply and drainage system, and solve practical problems of in manufacturing projects.

3. The Innovation of Talent Training Model

In 2014, based on the regional characteristics and advantageous industries of Guangxi, we took advantage of the strength of featured specialty in vocational colleges and the key specialty and demonstration specialty of in universities in the field of water supply and drainage science and engineering, and decided to construct a "2+2" joint talent training model. Students in the program learn basic theory, vocational theory and technology of their specialty field and they are also trained by engineers on basic vocational skills, so as to become highly skilled vocational talents capable of design, construction, technical research and operation management in the field of water supply and drainage engineering.

In the "2+2" training model, the students spend the the first four semesters in the university, taking basic theoretical courses to lay a solid academic foundation, under the instruction of teachers of the university; They spend the next 4 semesters in the vocational college, taking vocational courses, vocational practice and practical training, under the instruction of the teachers of the vocational college. Students' graduation design and internship training are jointly supervised by the university, the vocational college and the enterprise, hands-on

managed by a teacher from either the vocational college or the university, and assisted by his counterpart in the other college. The graduation defense is held in the university.

The "2 + 2" joint training model can also be summarized as the "three-party co-education, four-tight-link , five-progressive-step progressive" high-end application-oriented talent training model.

The three-party co-education refers to the cooperation of the vocational college, the university and enterprise, aiming to realize the strong-strong combination, complementary advantages, co-management and win-win situation, and jointly promote the construction of high-end applied water supply and drainage science and engineering specialty; the "four-tight-link" refers to the combination of the quality education of disciplines, the implementation of integration of theory and practice, skill training, and on-field internship. Five-progressive-step refers to the whole process of theoretical and technical teaching, which is accomplished by employing the training methods of vocational quality, vocational basic ability, on-field skill and comprehensive ability step by step according to the rules of personnel training, and finally carrying out on-field practice.

The new joint talent training model we adopt has obvious advantages and distinct characteristics. It helps to train engineers with a scientific and reasonable knowledge background, a solid theoretical basis, strong operational skills, and the capability to serve on the front line of production and management. On graduation, the students can obtain four certificates, namely, degree certificate, diploma, vocational qualification certificate and quality education certificate.

4. The Construction of Curriculum System

The purpose of collaborative education between vocational Colleges and universities is to train and provide skilled talents for the society. Applied undergraduate talents are "inter-disciplined talents" between traditional subject-based talents and vocational skill-based talents. They embody both the characteristics of subject knowledge of undergraduate talents and the characteristics of vocational, vocational talents. Advanced technical and skilled talents have both the characteristics of discipline and those of application, which requires that the choice of course content to not only ensure that students have a relatively systematic grasp of subject knowledge and theories, laying a a foundation for the follow-up learning and research; but also meet the actual needs of industry, trade and occupation to improve students' integrated innovation capability.

At present, vocational colleges have a mature curriculum system with remarkable "vocational" characteristics. Universities also have a mature curriculum system, with focus on "solid theoretical basis" and creative application of knowledge to solve practical problems. In the process of constructing course curriculum and training program, we aim to meet the needs of the society and cultivate the application ability of advanced technical skills, so as to increase the proportion of practical teaching in the teaching plan, and enable the graduates to master solid basic theoretical knowledge and cultivate characteristics such as strong technical application ability, a wide range of knowledge and high-quality, etc.

According to the cognitive rules of the various stages of talent training, we adopt the idea of modular design. The curriculum system consists of five modules: public basic courses, subject basic courses, vocational basic courses, vocational core courses, graduation design and post-graduate internship. The five modules are closely knitted, reasonably connected and fully integrated, forming A curriculum system suitable for the cultivation of application ability.

4.1. Building a Thick Foundation and Wide-Caliber Theoretical Curriculum System

In view of the fact that application-oriented undergraduate talents have the characteristics of solid basic knowledge and strong applicability in the knowledge structure system, it is necessary to strengthen the integration of theoretical courses in constructing the curriculum system, emphasize on the applicability of theoretical teaching, and construct a platform with clear objectives, strong logic and modularity for theoretical teaching. In the basic modules of public basic courses, subject basic courses and vocational basic courses, we should reform the teaching contents and curriculum system, emphasize the framework of basic and vocational platforms, and gradually form a platform structure of "foundation + specialty" and a modularized vertical structure of "specialty-oriented courses + cross-specialty optional courses", so as to ensure the smooth realization of the goal of personnel training and enhance students' social adaptability.

4.2. Constructing the Practical Curriculum System of the Three Party Integration of Schools and Enterprises

To construct a training system which combines the whole process of learning from top to bottom, internal and external links with the post training of off-campus enterprises, schools and enterprises should build a joint management training base, and emphasize the training of students' skills and innovative ability, and stimulate students' interest in vocational learning and curiosity in research.

4.3. Building Various Forms of Curriculum System Which Develops Vocational Quality

The quality development of water supply and drainage science and engineering area includes the training of social comprehensive ability and vocational extension. The quality development training in school is carried out flexibly through various forms. The combination of universities and vocational colleges in scientific research work and the combination of vocational characteristics can stimulate and cultivate students' scientific research and innovative spirit. Cultivate students' scientific literacy and strive to enhance students' enthusiasm for learning and research. The improvement of vocational theory level, practical ability and comprehensive quality enhance each other, which fully reflects the characteristics of high-end application-oriented undergraduate talent training.

4.4. Organic Integration of Subject and Specialty Integrated Teaching

The curriculum system of application-oriented undergraduate course not only includes subject theory, but also take into consideration the requirement of the post or the group of posts targeted. The contents of the course are compiled according to the workflow, meaning that the curriculum is basically in line with the workflow. Through the course study, the students can basically understand the work contents and procedures, without losing the progressiveness and modularity of the subject curriculum. The combination of compulsory courses and elective courses has a clear career orientation, forming a curriculum system featuring the integration of subject and specialty teaching.

To reform and innovate the vocational courses (including basic courses and core courses) from the aspects of setting up curriculum plans, curriculum objectives, teaching unit design and optimizing the combination of teaching contents, so as to streamline and enhance the contents of the subject courses, so as to fully reflect the characteristics of vocational education, fully embody the new undergraduate education model of vocational talents.

5. The Form of Teaching Organization

The construction of teaching organizational form is embedded in the reform of the curriculum system and the reform of the whole teaching system. Adopting the teaching organizational form of the organic integration of the vocational college, the university and the enterprise will improve the teaching efficiency of joint school management, so that various effective teaching methods and means can be applied in the corresponding teaching organizational form.

5.1. Teaching Cooperation for Vocational Ability Training

The university mainly undertakes the teaching of three modules: public basic courses, subject basic courses and vocational basic courses; the vocational college mainly undertakes the teaching of vocational core courses and graduation design modules; the cooperative enterprise provides internship training places and participates in on-field training guidance.

5.2. Vocational Basic Ability Teaching Cooperation

The university participates in theoretical teaching of vocational core courses; the vocational college participates in the training of integrated theoretical and practical projects and theoretical teaching of vocational core courses; the cooperative enterprise provides on-field training places and participate in practical training guidance.

5.3. Teaching Cooperation to Train Job Skills and Special Ability

The university participates in the quality assessment and supervision of skills training; the vocational college participates in the integration of theory and practice job skills training and vocational curriculum theory teaching; the enterprise participates in vocational skills training guidance, and vocational skills training evaluation.

5.4. Teaching Cooperation in Graduation Design

The university organizes the graduation design. Together with the vocational college and the cooperative enterprise, it participates in the whole process of the setting up of graduation design plan, the graduation design guidance, the graduation design defense, the graduation achievement appraisal, etc. The university participates in the whole process of the quality supervision of the graduation design.

The three party cooperate with each other, complete the module teaching together and participate in the whole process of personnel training.

6. Measures of Joint School Management

6.1. The Triad Teaching Team of the Undergraduate, Vocational College, Enterprise

Teaching team building is an important part of the joint training of high-end applied undergraduate talents, and also an important guarantee to improve the quality of high-end applied skilled talent training. In order to ensure the effective implementation of the joint training and achieve the desired results, through the triad of undergraduate-vocational-enterprise cooperation, we set up a teaching team with reasonable structure, mutual cooperation, complementary ability and full of vitality. We will combine the solid undergraduate theory teaching, remarkable vocational training with the needs of the enterprise to effectively improve teaching. It is of great significance to teachers' teaching, research, and the improvement of the whole teaching team.

6.1.1. The Three Sides Build Together, Complement Each Other and Enhance Each Other

The applied undergraduate teaching team of water supply and drainage science and engineering is composed of the university, the vocational college and the cooperative enterprise. The team works together to develop talent training programs, curriculum system, explore teaching models and teaching methods and teaching content. Benefiting from the advantages of high-quality teaching team in the vocational college and the high scientific research level of the teaching team in the university, the basic theory course is mainly taken up by the teaching team of university, the vocational fundamental and core courses are jointly taken up by the teaching team of university and vocational colleges, and the practice and internshi training courses are taught by teachers from the vocational college and the cooperative enterprise. By doing this, the components complement and enhance each other.

6.1.2. Improve "Three Leaders" System for the Teaching Team

We establish the system of tripartite vocational leaders of the university, the vocational college and the cooperative enterprise. The vocational leader appointed by the university brings forth prominence in scientific research ability and basic theoretical research ability. the vocational leader appointed by the vocational college bring forth prominence in vocational applied research ability and vocational theoretical research ability. And the vocational leader appointed by cooperative enterprises brings forth prominence to technology research and operation ability. The combination of strong components forms the a innovative joint teaching team with both theory and skills, research and development ability.

6.1.3. We Improve the "Double-Qualification" Teacher Guarantee Mechanism

Perfecting the guarantee mechanism of "double-qualified" teachers is the key to running practical undergraduate education with distinctive features and improving the quality of education and teaching. The main measures are as follows:

- (1) Perfecting the training system of "double-qualification" teachers, and establishing a long-term mechanism of training, supplementary and continuing education for "double-qualification" teachers. Encouraging young teachers to enhance their vocational training and promoting the vocational theory learning of young teachers.
- (2) three party cooperation to build "double qualification" teacher training base. Making full use of the technical practice platform provided by the cooperative enterprise, selecting young teachers to work in the cooperative enterprise, promote the improvement of young teachers' practical experience, and which will in turn benefit their teaching.
- (3) Establishing a system conducive to technical and skilled talents to come to school and teach, broadening the channels for recruiting "double-qualification" teachers, and increasing the recruiting of vocational and technical personnel and high-skilled talents in industry and enterprises.
- (4)Introducing part-time teacher employment policies and management measures to encourage specialists from universities and universities and senior skilled talents from enterprises to serve as vocational teachers and practical instructors in vocational undergraduate education.

6.1.4. The Three Parties Carry Out Teaching Cooperation and Communication of Various Forms and Improve Tthe Vocational Skills and Teaching Level of the Teaching Team

The three parties hold regular learning and exchanges to jointly promote vocational development and discipline construction. Experienced experts of enterprises are invited to hold regular technical or scientific research lectures for teachers to keep the teachers posted on the latest technology and scientific research information, so as to keep the teaching content up to date with the practical technology application. We strengthen cooperation in specialized

subjects and key technical projects so that the three parties involved in joint education can enhance each other's scientific and technological development and social services.

6.2. Practical Teaching Conditions

To train high-end application-oriented undergraduate talents, it is necessary to have verifiable and operational training equipment to cultivate students' job skills and experimental research equipment to cultivate students' ability of scientific research and solving practical engineering problems. Therefore, A series of training bases suitable for ability development are built by the university and the cooperative enterprise.

6.2.1. We Build a on-Campus Practical Training Base Integrating Training and Scientific Research

At present, the water supply and drainage training labs in vocational colleges are training labs mainly for verification and operation, which mostly meet the need of the operational training of vocational undergraduate skills. On the basis of meeting the technical training conditions, with its own capabilities, the vocational college gradually acquire scientific research-oriented equipment; at the same time, with the strong scientific research capability and complete experimental equipment of the university, resources are shared, research cooperation is carried out. Professors and experts from different industries come to the college from time to time to conduct scientific research and experimental guidance, so as to improve the scientific research level of the teaching team. At the same time, we try to get the support of participating enterprises and equipment manufacturers, relocate scientific research training equipments to the campus, jointly build and manage experimental training labs and share experimental results.

6.2.2. We Make Good Use of the Advantages of the Industry and the Joint Efforts of the Three Parties, and Gradually Improve the Construction of Off-Campus Trainingbases

With the good social image of the university and the powerful development platform of the School-Enterprise Cooperation Council of the vocational college, the off-campus training base will be continuously expanded; at the same time, with the good development prospect of the cooperative enterprise, the training sites and training projects will be continuously improved and expanded to meet the requirements of the off-campus training program for high-end applied talents. . During the construction of the training lab, the responsibilities of each party are clarified and the members are mutually supportive.

7. Conclusion

On the basis of absorbing the distinct characteristics of each college and through a series of joint school management measures such as curriculum setting and teaching organization, the vocational college and the university have cultivated practical undergraduate talents with solid theoretical knowledge and strong practical ability, thus solving the problem that traditional undergraduate talents value theory more than practice while vocational college attach importance to practice than theory. This method realizes the complementary advantages of both sides, and meets the demand of application-oriented talents in the new normal economic development. At the same time, there is a long way to go for the vocational college to cooperate with the university in educating students to deepen the reform of higher education and explore a new model of cultivating vocational undergraduate talents. To overcome this difficulty, it requires the joint efforts of the vocational college, the university and the cooperative enterprise.

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