

Exploration and Practice on the Construction of Productive Practice Training Base for Road, Bridge, and River-Crossing Engineering Specialty in Higher Vocational Colleges

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Abstract—On-campus productive practice and training bases, the main platform to improve the professional practice level of students in higher vocational colleges, play an irreplaceable role in cultivating talents and serving the society. Therefore, the exploration of the new mode of constructing high-level training base is an effective way for higher vocational colleges to better their talent training. This paper probes into the construction idea and mode of productive training base in college, and provides reference for higher vocational colleges to accelerate the construction of productive training base.

Keywords: *productive training base, construction ideas, practice*

I. INTRODUCTION

The nature of higher vocational education determines its mission: to train highly skilled personnel for the frontline of production, construction, service, and management. In this way, the cultivated students should not only master professional theoretical knowledge, but also be equipped with practical working ability and vocational skills necessary for professional fields. Higher vocational education pursues the talent training concept of "cultivating talents with entrepreneurial abilities, employment skills, further learning opportunities and lifelong development foundation". With the cultivation of students' practical ability as the foundation and the purpose of serving the society, higher vocational colleges take the road of highly integrated development of industry and education to foster high-quality technical talents for the frontline of production, construction and management, which has been widely recognized in the field of vocational education.

II. MAJOR PROBLEMS EXISTING IN THE CONSTRUCTION OF PRACTICE BASES IN HIGHER VOCATIONAL COLLEGES AGAINST THE CURRENT SITUATION

The goal of talent training in higher vocational education determines that students must rely on the real workplace environment to develop professional ability and quality.

Generally speaking, vocational colleges in China mainly cultivate students' professional ability and quality through on-campus experimental training and off-campus enterprise internships.

Despite the fact that in-campus experimental training and off-campus internship have played a positive role in the cultivation of students' professional ability and quality, many of their shortcomings have been exposed in the practice process, mainly reflected in the following points. The former focuses more on checking and correcting existing theories and knowledge, as well as simulating production, operation, and technical management. It lacks the real situation of enterprise production, operation, and management, so it is difficult for students to get practical vocational experience and training, which is not conducive to the cultivation of students' comprehensive quality and vocational ability. While the latter focuses more on the production and management of enterprises, with "enterprises as the main body and schools as the auxiliary body". Schools are more dependent on enterprises, which cannot be contacted by students or teachers for the protection of intellectual property rights, core technologies and key technologies. Due to the particularity of enterprise production, it is difficult for enterprises to meet the internship time arrangement and large quantities of personnel internship stipulated in the teaching of professional personnel training program. In view of the differences in concepts, systems and mechanisms, as well as the pursuit of goals, the two sides of school-enterprise cooperation are different in their subjective willingness, enthusiasm and initiative. The school actively seeks more cooperation with enterprise, while the enterprise seldom takes the initiative to cooperate with school, thus the two pose a contrast. The long-term cooperation mechanism of two-way interaction, and mutual reciprocity between schools and enterprises is not stable, which is not conducive to improving the quality of talent training.

III. MAJOR MODES OF TRAINING BASE CONSTRUCTION IN HIGHER VOCATIONAL COLLEGES

As the base of practical teaching in higher vocational colleges, the on-campus productive training base is the most ideal place to train students' professional ability and an important embodiment of the characteristics of higher vocational colleges. At present, there are many construction modes for productive training bases in higher vocational colleges. In view of the production characteristics, professional ability formation process and the special environment of professional practice in the major, industry, and enterprise of Road, Bridge and River-crossing Engineering, the productive training base of Road, Bridge and River-crossing Engineering in higher vocational colleges has gradually formed the combination mode of "enterprise-oriented", "college-oriented", "co-construction and sharing" and so on.

A. *Enterprise-oriented mode*

Enterprise-oriented mode refers to that the enterprise, as the main body of cooperation, is responsible for organizing production and arranging practical training, and enjoys more say. The model benefits both enterprises and schools, which is more conducive to reducing costs. In addition, the school can obtain certain economic benefits while completing the productive practice and training teaching tasks. However, its disadvantage lies in that enterprises will inevitably affect the quality of students' practice and training to ensure their normal production and operation.

B. *Co-construction and sharing mode*

Against the co-construction and sharing mode, the school and the enterprise follow the principle of equal interests and resource sharing, and completely follow the modern enterprise system management mode to jointly construct on-campus productive practice and training base. Its advantage is the clarity between responsibilities, rights and interests. While fully guaranteeing the project quality standards and production efficiency, it can greatly reduce labor costs and reserve a large number of highly skilled personnel for enterprises. Its disadvantage is that many uncertain factors in the cooperation will affect the stability of the cooperation. The teaching arrangement will also be restricted by the actual production of enterprises, resulting in the relatively small initiative and flexibility of practical teaching, thus affecting the breadth and depth of school-enterprise cooperation.

C. *College-oriented mode*

College-oriented mode refers to that colleges, as the main body of construction, raise funds for construction by themselves, rely on school-run enterprises, and use the law of the market for operation and management. It has strong autonomy in the arrangement of practical teaching, and prioritizes the maximum satisfaction of professional practice to realize the coordinated development of production and practice, which can directly and effectively improve students' professional skills and qualities. Moreover, it does not

blindly pursue interests, but relies on actual projects to truly demonstrate the integration of "teaching, learning and doing" in teaching and that of "production, learning and research" in function through actual production process, so as to realize the integration of theoretical teaching and practical teaching, of learning process and working process, of ability cultivation and knowledge application, and of school learning and employment in enterprises. What's more, in addition to realizing the basic functions of talent training, the construction of productive practice and training bases should also actively explore expanded functions such as vocational training, skill appraisal, technical service and vocational quality training.

IV. THE PURPOSE AND SIGNIFICANCE OF THE CONSTRUCTION

Higher vocational education is fated to connect with industry. As soon as it appeared, it established the school-running philosophy of "service-oriented and employment-oriented", and made clear the goal of cultivating high-quality skilled talents for the front line of production, construction, management and service. Practice and training is the most effective teaching method for students majoring in Road, Bridge and River-crossing Engineering to improve their practical skills, which requires higher vocational education to highlight practical teaching and emphasize ability-based standards. It's also necessary to be self-reliant and speed up the construction of on-campus productive practice and training base. The Institute of Highway Design established by the college where the author is located, taking advantage of talents and resources and catering to the development of the industry, has played a prominent role in serving the industry, the society, school development, teaching and training, etc. and become the characteristics and advantages of talent training in the college.

Higher vocational education, distinct in profession and practicality, pays more attention to practical skills and operational ability. Practical education, the connotation of higher vocational education, is impossible to be promoted simply by combining work with study: off-campus practice training base and classroom teaching. The improvement of students' practical skills requires a real professional atmosphere and training situation, which can only be provided by self-managed on-campus productive practice and training bases. Therefore, it is necessary to integrate practical teaching into production, so that the teaching content and teaching process are more realistic; to set up courses and teaching contents dynamically and scientifically according to the project duration and requirements of vocational posts, so as to realize the docking of course content with vocational standards and teaching process with production process. Therefore, the high integration of study and work, education and practice, school and society can be realized. It is also necessary to carry out a new mode of teaching reform which is supported by projects and driven by tasks, so as to realize the goal of training high-quality technical talents in higher vocational colleges.

V. THE LEADING THOUGHT AND MAIN PRINCIPLE OF CONSTRUCTION

Firstly, the college-oriented and self-managed on-campus productive training base must comply with and serve the development requirements of the industry and the goal requirements of regional economic development, so that students can improve their professional theoretical knowledge while acquiring basic theoretical knowledge, improve the basic professional skills while practicing the basic professional skills, and cultivate good professional dedication while developing good professional ethics. Secondly, the base should be open to the society in terms of overall design and basic environment. It should not only meet the practical training needs of students to achieve basic skills on campus, but also meet the training needs of various vocational skills of off-campus enterprises. In the process of serving the industry and the society, the base has gradually become a window for the college to communicate with the outside and a model for serving the society. Thirdly, the base should shoulder the function of vocational skill training and vocational quality cultivation, and play a greater role in realizing the task of integrating vocational ability training, vocational quality training and vocational skill assessment. Finally, the "seven integration" including the integration of production site and classroom, of students and workers, of designers and teachers, of teaching content and production tasks, of teaching tools and production tools, of teaching and scientific research, and of education and income generation, and the "five function" covering talent training, "double-qualified" teacher training, technical exchange and resource sharing, production and technical services, and income generation, can be realized. The following three aspects are highlighted in the construction process.

A. Highlighting talent training

The base aims to realize the integration of "teaching, learning and doing" in teaching and of "production, learning and research" in functions through production process, so as to cultivate technical talents with fine technical skills, high professional quality, strong work ability, and both academic and vocational certificates. Therefore, the construction of productive practice and training base should always focus on the goals set by the personnel training plan, and rationally lay out its functions according to internship training, vocational training, skill appraisal, production management, technology promotion and vocational quality training, so as to fully reflect its characteristics of profession, authenticity and openness. It is necessary to promote the innovation of production practice teaching mode, strengthen the integration of teaching, learning, practice education, and carry out teaching modes such as project teaching and process-oriented teaching to realize the docking of specialty setting and industrial demand, curriculum content and vocational standards, and teaching process and production process, so that students can truly become the biggest beneficiaries of the construction of productive practice and practical training base on campus. Therefore, highlighting talent training is the fundamental purpose of the construction of productive practice and training base.

B. Focusing on mechanism building

During the construction of the on-campus productive practice and training base, the long-term operation mechanism of "school-enterprise cooperation and integration of work and learning" must first clarify the responsibilities, rights and interests of the school, the college and the base, so as to effectively regulate the behaviors of all parties. The following points should be noted in the operation and management of the base. The first is the establishment of a modern enterprise system, and the implementation of enterprise management to achieve co-construction of the base and talent co-education. The second is to innovate the incentive mechanism, making it not only ensures people first, but also reflects the integration of school and enterprise. It takes industry standards, enterprise regulations, technological processes and technical norms as the basic requirements for students' vocational and technical skills training, and integrates the concept of enterprise management into school administration. The third is to focus on building corporate culture, attach great importance to professional ethics and humanistic quality, cultivate students' professionalism and sense of responsibility, and establish widely recognized corporate philosophy. The fourth is to develop management system implementation procedures scientifically, make fine management and scientific operation become the guarantee of the sustainable development of the training base, continuously improve its level and ability of serving the society and the radiation area, and receive good economic and social benefits. Therefore, the construction of mechanism is the guarantee for the efficient operation of productive practice and training base.

C. Construction of "double-qualified" teachers

It is also necessary to promote the implementation of the system that allows teachers to work in enterprise for practice, increase the participation of teachers in the practice of corporate posts to make them familiar with post requirements and work processes at the base, encourage teachers to continuously improve their technical skills through professional qualification examination, better their practical skills, ability to organize production and enterprise practice teaching, so as to create a practice and training base on "double-qualified" teachers.

VI. PRACTICE AND INNOVATION ON CONSTRUCTION OF ON-CAMPUS PRODUCTIVE TRAINING BASE

The college where the author is studying has taken advantage of talents and resources to cater to the development of the industry, strengthened the education and teaching activities integrating teaching, learning and training, and established enterprises such as the Institute of Highway Design and Highway Engineering Test Station, which have been engaged in business for many years and have all made great contribution for infrastructure construction, college development, teaching, etc. in Jilin. It has become the characteristics and advantages of talent training in the college, providing theoretical support and practical exploration for the construction of a new mode of college-led

and self-managed on-campus productive practice and training base.

Design institute, testing station, etc., as factory in school and school in factory, have greatly played their roles of productive practice and training bases. Active exploration has been made in the construction, operation and management mechanism of the base, forming a college-led mode with enterprises operating independently, so as to better the construction of productive teaching and training base.

On the one hand, in undertaking survey, design, and testing projects, school-run enterprises can fully utilize the talent and resource advantages of enterprise, and participate in the entire process of college talent training, which can not only give students create a rare opportunity to practice, but also accumulate experience for the shift of the base from consumption-based to production-based, so as to effectively promote the combination of production and education and create conditions for advancing personnel training mode characterized by school-enterprise cooperation and work-study integration. Students, the subject of the project, realize the mutual combination of teaching and production under the guidance of teachers in the base, and meet the dual functions of teaching and production through project survey, design, test and inspection and other production steps, realizing the double improvement of economic benefit and teaching effect. Since establishment, the Design Institute has undertaken more than 2,000 kilometers of highway survey and over 200 bridges. The Testing Station has undertaken most of the testing projects of municipal construction in Changchun, creating good conditions for students' practice and training.

On the other hand, the college increased the proportion of practical training in teaching and the practical teaching hours. The courses, graduation design and defense in the third academic year were taught or organized in the base. On this basis, it expands its scale, integrates resources such as personnel, equipment and external production, and combines production projects. The data collected by designers and teachers when instructing students in practical training are fully used in production and participate in the whole process of production. It is not for the purpose of profit, but to achieve the integration of "teaching, learning and doing" in teaching and that of "production, learning and research" in function through production process. The on-campus productive practice and training base, which has the functions of educating people, completing the actual production tasks, generating social benefits, and realizing the dual functions of teaching and "production", can be formed. The increase of practical class hours significantly improves the teaching effect, so that students can really improve their comprehensive vocational ability in production, and realize the seamless connection between employment and enterprises. The productive practice and training bases obviously enhance students' actual operation skill, and their occupation skill and employment quality are substantially improved. In this way, practical teaching has been given due attention, and the characteristics of higher vocational education have been highlighted, which has improved the

situation that the demand for students majoring in Road, Bridge and River-crossing Engineering has been in short supply. "Double high": high employment rate and high-quality employment rate, and "double satisfaction": employer satisfaction, graduates' satisfaction, can be realized.

VII. CONCLUSION

Factory in school, school in factory, and school in front of factory, the on-campus productive practice and training bases in higher vocational colleges, are necessary means to strengthen students' practical skills, important guarantee to realize the seamless connection between college and enterprise. The goal can be achieved only through the practice process of work-study alternation and production-driven training, so that students can gain professional skills through productive practice and training in working environment.

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