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Study on German Dual System Model Localization Practice in Wuxi—Take Wuxi Institute of Communications Technology as an Example

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Abstract: *Germany's "dual system" is the model of vocational education in the world. Curriculum localization is the key to implement the dual system, which plays an important role in the teaching of "dual system". Aiming at the problems of "professional teaching standards and professional standards are not closely corresponding; The depth of enterprise participation in school teaching process is not enough; The curriculum evaluation method does not fully refer to the vocational qualification examination standards, this paper systematically introduces the training approach, curriculum localization teaching implementation method and path of domestic vocational colleges in implementing dual system localization, and expounds the practical effect of localization, which provides a reference for other vocational colleges localization advanced experience in German vocational education.*

Keywords: *dual-system curriculum; localization; cultivation method; effect*

1. Introduction

Germany's "dual system" is the main model of Germany's high-skilled personnel training. Thanks to the "secret weapon", the high quality of German products and the post-war economic take-off has increased largely. *The "National Vocational Education Reform Implementation Plan" (2019)* pointed out that it is necessary to learn from the "dual system" vocational education experience and promote the integration of production and education in school and enterprise "dual" education[1]. In recent years, some domestic vocational colleges have successfully explored and practiced the localization practice of "dual system", which has promoted the high-quality development of vocational education. How to combine China's national conditions, closely focus on the needs of regional economic development in Wuxi, how to link teaching content and teaching process with vocational qualification examination, and realize the localization of dual-system vocational education model have become a hot issue for vocational education workers.

Taking the Sino-German cooperative class of mechatronic technology major of our institute as an example, this study analyzed the characteristics of German HWK vocational qualification courses, analyzed and explored the professional teaching under the German dual system training mode. Through "introduction, digestion, absorption and integration", we adopted the teaching approaches of empowering teachers, upgrading teaching materials, activating teaching methods and reforming evaluation. The practical teaching methods and paths of Sino-German cooperation "industrial Mechatricians" have been explored, and good results have been achieved in improving the quality of professional teaching in vocational colleges.

2. The method of localization implementation

2.1 Empowering teachers to improve their professional quality

Through the in-depth cooperation with Jiangsu Union Technical Institute and XINJE, we jointly implement the mechatronics technology (HWK) talent training model to achieve the deep exchange and integration of teachers, and the teachers between schools and enterprises are mutually employed.

In the process of cooperation between the two, the Handwerkskammer (HWK) imported the German "dual system" vocational education concept, carried out ADA teacher training, and changed the teaching concept of teacher education. We learned from Jiangsu Taicang Secondary Vocational School and Suzhou

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Chien-shiung Institute of Technology, and explore the dual-system education and teaching methods. The HWK curriculum reform teacher team consists of teachers from the basic teaching department, lecturers of specialized courses and part-time engineers of enterprises. Teachers and enterprise engineers can only obtain the ADA qualification certificate after strict professional qualification training and vocational and labor education training, and pass the practical and theoretical examinations. After that, they can fulfill their job with the certificate. The enterprise provides positions for teachers, so they can exchange expertise in hardware conditions, technical fields and standards, management and culture level. And enterprises also provide teachers with situations and resources for curriculum development. Teachers also actively impart teaching theories and methods to corporate trainers, help engineers to make courseware, and assist them in teaching. By signing an agreement with the Handwerkskammer (HWK) to train young teachers in a planned way, we enhance our teachers' international vision, practical teaching ability and technology research and development ability, and also build a "skilled, professional and multi-leveled" teacher team.

2.2 "Upgrading" teaching materials and changing the inherent thinking of teaching

The upgrading of teaching materials is mainly carried out in the order of updating teaching content, perfecting course standards and developing teaching materials. Collages, associations and enterprises refer to the vocational training standards for industrial electromechanical engineers to jointly discuss the docking of professional structure and occupational classification, the docking of curriculum settings and job tasks, the docking of teaching content and professional ability, the combination of teaching and working situation, and the interaction of evaluation content and vocational qualification standards, so as to ensure the scientific and reasonable penetration and perfect connection between theoretical teaching and enterprise skill training. The curriculum structure of public foundation course, professional platform course, professional core course, professional direction course and professional elective course should be set up around professional activities. The curriculum standards in the field of learning are mainly developed by teachers, and the curriculum standards in the field of professional action are mainly developed by enterprise engineers. We need to adhere to the principle of sufficient basic course knowledge and practical professional course knowledge, in order to help students develop professional quality as the starting point, select and sequence course content, develop new loose-leaf and workbook-type textbooks, and build supporting course resources.

The reform of teaching materials is mainly carried out in three aspects. The content emphasizes application and practice; In the form, we develop the digital, three-dimensional new form of integrated teaching materials taking situation-based comprehensive vocational ability promotion as the core; and we also need to actively promote online open courses to meet the new needs of "Internet + Vocational Education".

2.3 Activating teaching method and implementing the integrated work model

Based on action-oriented teaching method, teaching is carried out in the real environment of enterprises, and it can also be carried out in the virtual simulation training environment, so as to achieve "teaching by doing, learning by doing, and teaching by learning". We adopted the German "six-step teaching method", that is, information, decision, plan, implemention, check and evaluation. This method is borrowed and transformed from the action-oriented teaching of "dual system" in Germany. It comprehensively cultivates students' professional knowledge, decision-making implementation, personal innovation, communication ability, team spirit and professional ethics[2], and changes the traditional mode of teachers imparting and students listening, allowing students to actively seek knowledge, think and discuss, and achieve the purpose of learning. The teacher is only a guide, not a transmitter. In the process of learning from the German "dual system" modle, the collages and the enterprises have carried out a series of localization exploration.

The German mechatronics major has a total of 13 learning areas. According to the local industry needs and future development direction of Wuxi, it selects some of the contents to set up the curriculum system, develop textbooks, and establish the HWK examination and certification center. The HWK vocational qualification certificate is certified by the Handwerkskammer. The purpose of establishing an examination and certification center is not to obtain a certificate, but to see the HWK exam as a very perfect assessment method. HWK test content is a set of systematic operation, which can allow students to re-use the knowledge learned, integrate it into the practical teaching link, which also cultivates students' comprehensive ability. The Sino-German HWK Examination and Certification Center fully considers four structures: the spatial structure is the overall arrangement of the region according to the

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professional direction and curriculum elements; The functional framework is to comprehensively consider the basic skills training function, the integrated practical training function, the professional experience function of mechatronics, the social training of enterprise employees and other functions. The cultural framework is the three-dimensional layout of professional, enterprise and professional culture, comprehensively establishing the awareness of safety, economy and environmental protection; The efficiency structure determines the number of equipment by the total number of courses and the annual utilization rate of equipment, and the annual utilization rate of equipment is controlled above 85%. Collages undertakes the teaching of students' cultural basic courses and professional theory and skill courses, and the center undertakes the teaching tasks of professional practice that collages cannot completed. The focus of the reform of teaching method is to adopt the mode of implementing project teaching in vocational context, cultivate students' professional core skills and improve students' professional quality. The professional ability, method ability, social ability and personal quality required for vocational positions are integrated into the practical training project, and students complete the project in accordance with professional norms.

2.4 Reforming the examination to form an effective evaluation mechanism

Based on the German HWK verification model, the original teaching evaluation mode is adjusted, and a new evaluation system is developed, which is divided into two parts: assessment and evaluation. Assessment includes normal assessment and stage assessment. Normal assessment consists of theoretical assessment and practical assessment, including self-assessment, mutual assessment and teacher assessment. The stage assessment is divided into mid-term examination and final examination, with increasing difficulty and scope of assessment.[4] The theoretical assessment includes six aspects: training log record, preparation before class, class, homework, social behavior and exam results. Practice assessment includes eight aspects: program design, professional knowledge, work speed, work quality, practice attitude, social behavior, safe production and professional accomplishment. The assessment is organized by Handwerkskammer, including three parts: well learned and used professional theory, professional skills practical operation and professional scene dialogue, and the average assessment time is 9.5 hours. In the process of assessment, collages invite engineers from enterprises to participate in the evaluation.

The stage exam and mid-term exam are in the fifth semester, and the final exam is in the eighth semester. The scores of the two stages are converted into a proportional sum to determine whether the student has passed the exam. The consistency of evaluation mechanism realizes the integration of talent training.

3. Implementation methods of localization teaching

3.1 Cultivating local teacher teams

Teachers are the core factors of teaching and play a key role in the localization process of German dual system model, so it is very important to train dual system teachers. Collages arranged for Chinese teachers to receive professional training and further study in the Asia Pacific Center of Handwerkskammer, and Handwerkskammer arranged foreign teachers to attend the school to evaluate lessons and demonstrate guidance; Collages also need to carry out infiltration training of professional construction platform, supplemented by special report lecture training. By cultivating teachers' application ability and professional skill level of dual-system vocational education concept, German materials can be integrated into curriculum resources suitable for Wuxi localization teaching.

3.2 Building a localized talent training program

As for the talents cultivation plan, in addition to the requirements for public basic courses which is as same as that of collages, the main framework of professional courses comes from the Handwerkskammer. The requirements of German vocational qualifications and technical skills are integrated into the talent training program, and the model of "integrating work with work and combining science with practice" is constructed[3]. The teaching content is localized according to German standards and combined with the actual situation in Wuxi, and the examination and certification work is assessed by the Handwerkskammer. Students graduate with a "double certificate", that is, a college diploma and an industrial Mechatronic professional qualification certificate (HWK issued). The talent training program is characterized by the curriculum model of "professional courses + project teaching", which

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refers to the addition of real enterprise projects on the basis of professional course learning, so as to cultivate students' basic theoretical knowledge and strengthen their practical ability of engineering.

3.3 Developing a localized German curriculum

In the implementation of the talent training program of the Sino-German cooperation class, more than half of the courses are carried out in accordance with the HWK vocational qualification teaching standards for industrial mechatricians, relying on the German curriculum standard framework to carry out local development in Wuxi. According to the requirements of China's vocational and technical development and the practical training conditions of regional colleges and universities, the five-year vocational guidance personnel training program will be connected, and the teaching content of German side will be integrated, optimized and reconstructed. Finally, German experts, professional teachers from collages and enterprise engineers will exchange and discuss to made consensus; The study field division method of German vocational school is adopted to create learning situation for course organization.[5] Teaching is organized by project leading, task driven, working page leading, group teaching and other methods. It is an important task for Wuxi to develop teaching materials that meet the professional qualification standards of German industrial mechatricians, which requires in-depth research and understanding of the dual system and HWK course materials.

4. The training effect of localization practice

Through the practical exploration of the reform of the mode of talent training, the school has clearly felt the significant improvement of teachers' ability, the change of classroom teaching concept, and the emergence of students' learning motivation.

4.1 Improving students' comprehensive vocational ability

The fundamental purpose of the dual system localization practice is to improve students' comprehensive vocational ability. At present, the new curriculum system has been applied to cultivate students for 3 sessions, and the average score is in the forefront of the class in the same grade. In the teaching process, the teaching content and difficulty of colleges and enterprises should be strictly defined, and a new "education chain" of integration of work and engineering and joint education of collages, associations and enterprises should be formed. We need to impart to students the knowledge, ability and quality that are newer and more able to meet the needs of enterprises, and focus on cultivating students' vocational competence for the position. We also need to let students accept the training of strict high-quality technical and technical talents in the process of academic improvement, let the professional quality, safety awareness and 7S management be deeply rooted in people's hearts, and cultivate students' sustainable development and innovation ability on this basis, promoting students towards "industrial demand orientation", and transport excellent skills for the mechanical and electrical industry.

4.2 Improving the comprehensive professional quality of teachers

The key to the success of the localization of dual system lies in teachers. Teachers take advantage of winter and summer vacations to participate in training, and a total of 482 teaches have joined the program in the past three years. We need to actively set up a teaching team, carried out curriculum development, completed one mechatronics technology (HWK) implementation talent training program, 12 curriculum standards, and 4 cloud textbooks and loose-leaf textbooks under development. Since 2020, the team teachers have offered 14 municipal open classes, 16 papers have won awards in the municipal paper competition, including 1 group of provincial first prize and second prize, and 4 projects at or above the municipal level have been concluded. We also guided the students to participate in all kinds of competitions at all levels and won 12 national and provincial medals during the past 3 years, all the teachers' informatization teaching ability competitions won prizes, with 3 teachers winning second prize of Jiangsu Province, 9 teachers winning the third prize, 6 teachers winning second prize and 6 winning the third prize of Wuxi City. 1 teacher was awarded as excellent teacher of Jiangsu Union Technical Institute. 1 teaching team was awarded as Jiangsu University Blue Engineering Team, 1 studio was awarded as famous teacher studio of Jiangsu Province Vocational Education. There are also other awards like one Excellent Teaching Innovation Team of Jiangsu Transportation System, one Jiangsu Transportation Industry Skills Master Studio and one Wuxi Transportation Industry Skills Master Studio.

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4.3 Improving professional social service ability

Collages and Shanghai Mitsubishi Elevator Wuxi Branch, Jinxin Meilek (Wuxi) Co., Ltd. and other enterprises to carry out new apprenticeship staff training, the collages and enterprises jointly set up classes to jointly develop courses. In 2019, we started to create comprehensive training for employees of Finisa Optoelectronic Communication Co., LTD., and trained 155 new employees, 146 of whom obtained intermediate certificates. In the terms of technical services, with North Huguang Optoelectronics (Wuxi) Co., Ltd. to carry out 3 horizontal projects, to provide technical services for enterprises. The College of Intelligent Equipment Industry was established with Wuxi XINJE Electric Co., LTD., which laid the foundation for further building a high-level professional and dual-ability teacher team. The project was awarded the five-year high vocational and high-level industrial college of Jiangsu Union Technical Institute.

5. Conclusion

The localization practice of the German dual-system vocational education model in Wuxi is the main task of learning and applying the German dual-system educational concept. Vocational colleges need to build implementable talent training programs according to regional realities, restructure course content, develop supporting textbooks and teaching resources, pay attention to the integration of professional practical training conditions. In the teaching process, student-centered teaching concept should be implemented and information-based means should be adopted to strengthen the cultivation of key capabilities. Indeed, localization teaching practice is a systematic project, involving various elements such as professional teacher training, the reform of integrated engineering teaching method, the construction of professional teaching resources, and the setting of teaching situations. In practice, we feel that there is still much room for improvement in the transformation of teachers' educational concepts and the depth of enterprises' participation. It needs to be effectively stimulated and guided through policy incentives, effect experience, and establishment of an integrated community of production and education.

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References

[1] Xu Xiaoyin. Research on Dual Vocational Education in Germany [J]. Science and Technology Economics Guide, 2019 (09).
[2] Jia Hongsheng. Inspiration from the construction of cross-enterprise Training Center in Germany to higher vocational education in China [J]. Vocational Technology, 2018 (17).
[3] Chen Yuanzhao, Zhong Xiaohong, Wu Xinye, et al. Exploration and practice of "dual system" talent training in professional groups from the perspective of regional economy [J]. Higher Vocational Education (Journal of Tianjin Vocational University), 2019 (06).
[4] Xu Xiaoqing. Analysis and experience of the "Dual System" Model of German Higher Education [J]. Education Review, 2017 (1).
[5] Nie Zhanglong. A typical case study on the docking of teaching process and production process: Studio-based cultivation of outstanding talents [J]. Communication of Vocational Education, 2015 (23).