

Research on Practical Teaching Methods “Comprehensive Failure Inspection and Maintenance” of the Automotive Profession in Higher Vocational Colleges

—Take the Hunan Defense Industry Polytechnic College as an Example

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Abstract—Hunan Defense Industry Polytechnic College, as a university-enterprise cooperation and a combination of work and study in higher vocational colleges, puts practical teaching in the first place in the automotive teaching process, and gives full play to the advantages of school-enterprise cooperation in practical teaching, then enhances the hands-on ability of students to learn automotive-related professional knowledge. The theoretical knowledge of autos learned in class in the classroom is fully used in hands-on practice, and the knowledge is integrated into a systematic theoretical system. The teaching of the “Comprehensive failure inspection and maintenance” course will enable students to better understand the importance of the curriculum, continuously improve their learning ability and promote their better development in the future.

Keywords: *School-enterprise cooperation, Automobile specialty, Practical teaching, Vocational college*

I. INTRODUCTION

School-enterprise cooperation is a cooperation model established between schools and enterprises. Vocational education institutions take the form of cooperation with enterprises in order to pursue their own development and quality education. It has focused on cultivating talents for enterprises and focuses on the practicability and effectiveness of talents. Most of the traditional classroom teaching is based on the teacher-centered teaching method. The teaching method is single, and practice and theory are separated. The limited space and funding conditions of higher vocational colleges make it difficult to provide students with a full-scale internship environment. The knowledge students learn in school cannot meet the needs of actual jobs. This leads to a relatively weak social adaptability and practical ability of the students. Companies such as automobile production workshops and auto 4S shops can provide practical and spacious internships and perfect internship equipment. This can help schools deal with problems encountered in practical teaching. School-enterprise cooperation can highlight students' main position in practice teaching and realize the dynamic and individualization of personnel training. This can meet the needs of enterprises for talents.

II. CONCENTRATED INTENSIFIED TRAINING COURSE

Institute of Vehicle Engineering is a secondary college of the Hunan Defense Industry Polytechnic College, all existing automotive professional (Automotive Inspection and Maintenance Technology, Automotive Manufacturing and Assembly Technology, Automotive Marketing and Services, Automotive Inspection and Maintenance Technology) were assigned a course called “Comprehensive failure inspection and maintenance”, and this course is a core course for auto majors. It trains students in the analysis of the automobile's comprehensive faults and masters the automobile's comprehensive troubleshooting methods. It is a practical training course that focuses on strengthening students' practical ability. It is a total of 80 festivals, 20 festivals per week, continuous teaching for 4 weeks, including the structural composition of automotive engines, chassis, and electrical appliances, fault diagnosis, etc. This has an important role in the formation of students' professional core competencies. Because the content of the “Comprehensive failure inspection and maintenance” course is rather complicated, in the actual teaching process, efficient teachers should adopt some reasonable teaching methods, which can effectively guarantee the quality of classroom teaching and continuously improve the students' comprehensive troubleshooting ability. In this way, vocational colleges and universities can train outstanding comprehensive troubleshooting talents for auto companies. “Comprehensive failure inspection and maintenance” is a highly professional course that can provide teachers with better teaching methods and further improve teachers' teaching quality. It allows students to master good comprehensive maintenance knowledge and understand the comprehensive operation. In order to ensure that students can better invest in comprehensive troubleshooting courses, teachers need to combine the actual situation of students to improve students' practical ability and self-learning ability.

III. THE CONSTRUCTION OF THE TEACHER TEAM FOR PRACTICAL TEACHING

The training of professional teachers is based on theory and it is impossible to cultivate job skills and capabilities.

Whether it is in the process of curriculum development or the implementation of teaching, teachers are required to have practical experience in the enterprise. Therefore, the Institute of Vehicle Engineering discharges some professional teachers to participate in the company practice. After these professional teachers have the practical experience of the enterprise, they can better transform the requirements of the work process task into the knowledge of the learning field of the teaching. They will impart the knowledge of each learning field to the students by the action orientation teaching methods. In this way, the principle of combination of the theoretical knowledge of each working process, it meets a spiraling demand. In the new curriculum standards, professional teachers are required to take action orientation principles. They break free from the role of teaching performers, indoctrinators, and judges and turn into the teaching organizers, guides, and mentors.

IV. SIX-STEP APPROACH BASED ON A WORK ORIENTATION

The work process refers to a complete working procedure in the enterprise's production practice which completes a specific work task and achieves work results. This process is relatively stable but dynamic. The work orientation is based on the typical work tasks of the actual work position, the learning content is the knowledge needed to complete the actual work task, the goal is to cultivate the professional competence required by the enterprise, and the main process is the learning of the practical process, which is a brand new mode of vocational education. From the beginning of the 1990s, the discussion and practice that has lasted for more than a decade in Germany have proved that whether it is from the theoretical perspective of teaching theory or the operational aspect of teaching practice, the work orientation teaching is a teaching program that integrates the professional discipline system and the professional action system. It is a new page in the teaching reform of German vocational schools. Higher vocational colleges conduct teaching in accordance with the complete working methods "information – plan – decision – making – implementation – inspection – evaluation". In the training course, professional teachers integrate the theory into practice, allowing students to use their brains to get hands-on, thus strengthening the training of students' professional skills. The practice teaching model based on the work orientation, professional teachers can guide students to learn in real situations, identify problems, ask questions, and solve problems. The entire teaching process is student-centered. Professional teachers return to the backstage as organizers, mentors, and facilitators, they observe and record student performance at any time and evaluate them. Work orientation curriculum model as a new mode of vocational education, it strengthens the relevance of vocational education curriculum content and work, integrates theory and practice, cultivates high-skilled and innovative talents, and realizes the leap-forward development of vocational education in China. Based on the work orientation curriculum model, the quality

characteristics and structure of college professional teachers present new features and development directions.

V. POST-INTERNSHIP FOR SCHOOL-ENTERPRISE COOPERATION

Post-internship is to arrange students to work positions, study at work, and start operations. Under the school-enterprise cooperation model, the school develops individualized students according to their individual characteristics and their needs for learning. It not only respects students' development aspirations and practical abilities, but also enables them to adapt to their jobs in a very short period of time. As a student's career transition period, post-internship is particularly important to shape the students' correct view of learning and work. It is not only a continuation of the comprehensive practice teaching in the school, but also a preliminary exercise for students to engage in social work. Post-internship can give students some excellent conditions for graduation design work, for example, scientific topics, real materials, practical exercises, reasonable evaluations, etc. This has become an ideal platform for deepening the reform of graduation design teaching in higher vocational colleges, and has also promoted the deep integration of schools and enterprises. First of all, students learn professional theoretical knowledge in schools, cultivate students' basic knowledge of their positions, and exercise basic literacy in the workplace. According to the needs of the cooperative enterprises and the actual situation of the students, students are training at the bases outside the university. Under the guidance of practical training teachers, students can rotate their positions to perform practical operations. In this way, students can become familiar with the operating standards and operational requirements of different positions in the company, which can lay a solid foundation for students' post-secondary internships and future career development. During the internship period, students directly enter the company's contact with the production, manufacture and assembly of automobiles. This not only deepens students' understanding of corporate culture, but also allows students to find problems in the actual operation process, which greatly enhance students' operational ability. At the same time, according to the different performances of students in internships, the school selects different positions to train students. For example, those students with stronger practical ability can develop careers in the direction of technical posts; those with more research ability can develop careers in the direction of R&D positions. This mode of personalized education can meet the actual needs of students' development and can also promote students' mastery of relevant theoretical skills. In the later practical training, professional teachers can also personally strengthen the guidance of students according to different job situations, and pave the way for the later career development of students.

VI. GRADUATION DESIGN UNDER THE SCHOOL-ENTERPRISE GUIDANCE COOPERATIVE

Graduation design is a comprehensive test of the students' comprehensive quality education and practical ability training. Its quality has become an important indicator for superior teaching authorities to measure the quality of teaching in higher vocational colleges. Higher vocational education must be oriented by employment, and this principle should be implemented in all aspects of education and teaching. For higher vocational students, graduation design is a practical exercise for them to apply their knowledge and skills to solve practical problems before they embark on a job. Employment-oriented characteristics should be more prominent. Higher vocational schools must always focus on the needs of society and employers, and prepares students for all aspects of their careers, including knowledge, skills, psychology, and professional qualities to improve their employability. Graduation design not only enables students to master and use the necessary theoretical knowledge, improves professional operating skills, and accumulates job experience. It also helps students develop a correct understanding of their careers and cultivate their overall professional qualities. This enables students to have a good psychological quality, professional ethics, cooperation ability and team spirit, which enables them to have the ability to innovate, individual development and sustainable development. When the students go to the company's actual work position, they use the knowledge and skills they have learned to complete the tasks and write a summary report or related papers according to the prescribed format and requirements. They analyze the nature, characteristics, knowledge and skill requirements of job jobs, describe production technology, process flow and working principles, analyze existing problems, and then they propose their own solutions, for example, automotive inspection and maintenance students design some automotive fault diagnosis flowcharts, automotive manufacturing and assembly students design some assembly process cards, etc. The purpose of graduation design is to use professional theoretical knowledge to solve practical problems in engineering. This puts forward certain requirements for the practical value and theoretical depth of graduation design. At the same time, this also pointed out a direction for the work idea of the "school-employees dual-teachers". In the theoretical research and practical operation, the " school-employees dual-teachers" has some advantages. A graduation design should be selected with a combination of internship positions. The corporate instructor is responsible for practical guidance, and measures the practical value of the graduates' design of the students. The school's professional teacher is responsible for providing theoretical support for graduation design, and measures the theoretical level of graduation design.

VII. SUMMARY

Hunan Defense Industry Polytechnic College, as a university-enterprise cooperation and a combination of work and study in higher vocational colleges, and puts

practical teaching in the first place in the automotive teaching process, gave full play to the advantages of school-enterprise cooperation in practical teaching, then enhanced the hands-on ability of students to learn automotive-related professional knowledge. The theoretical knowledge of autos learned in class in the classroom is fully used in hands-on practice, and the knowledge is integrated into a systematic theoretical system. The teaching of the "Comprehensive failure inspection and maintenance" course will enable students to better understand the importance of the curriculum, continuously improve their learning ability and promote their better development in the future.

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