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Research on Teaching Mode Reform of Practical Training Courses in Higher Vocational Education

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Abstract: Metalworking practical training is a comprehensive technical practical training course for mechanical and electrical, material, automobile, navigation and other majors in national vocational colleges. According to the students lack motivation, training project from actual production, talent cultivation can't due to common problems such as aptitude, since 2009, the depth of cooperation between colleges and close docking position requirements, through continuous construction, constantly optimize, formed the ideological guide, two line simultaneously, three yuan fusion, the fourth-order progressive "practice teaching model reform concept. Ideological and political guidance, stimulate students to improve the purpose of learning; The two lines are carried out simultaneously. Practical training courses are carried out offline, and virtual simulation training of metalworking is carried out online, so as to create a teaching platform combining online and offline. Three integration, training teachers, professional teachers, enterprise mentors diversified, structured teacher team; The four-step progressive talent training mode of "basic teaching practice training → interest class group training → elite class intensive training → competition group intensive training" is constructed

1. Overview of Research and Practice

The essence of vocational education requires schools to adhere to students' main body and ability standard in class, so that students can understand both theory and practice, and lay a solid foundation for career development. In September 2020, the Action Plan for Improving the Quality and Training of Vocational Education (2020-2023) issued by the Ministry of Education and other nine departments proposed to "promote the 'classroom revolution' of vocational schools, push the reform of curriculum teaching to the depth, strengthen practical teaching, and strengthen the assessment and evaluation of practice and training"[1].

“Metalworking practical training course in higher vocational colleges is a practical basic technical course.”[2]Metalworking practice training, as a course closely combining theory and practice, is the key to stimulate students' interest in learning, promote students to form the habit of independent learning, improve the ability of independent learning, and cultivate students' practical skills according to their own characteristics. The traditional metalworking training courses and

teaching mode can not meet the needs of the new era for higher professional quality specialized technical personnel. “Metalworking practical training is a comprehensive technical practical training course offered by mechanical and electrical, material, automobile, navigation and other majors in national vocational colleges.”[3] It is the earliest practical learning link for students in professional courses. The learning effect of metalworking training not only directly affects the learning of the follow-up professional courses, but also affects the training quality of most professional students. In the traditional teaching, the practical training projects are outdated and out of practice. Students learning objectives are not clear, learning motivation is lack;Can not be directed to students classification stratified teaching and other common problems.

Since 2009, the school and enterprise have cooperated deeply and closely matched the job demands. After continuous construction and optimization, the reform concept of practical training course teaching mode of "ideological and political leadership, two-line parallel development, three-way integration and four-step progressive" has been formed.

Guided by curriculum ideology and politics, this achievement builds the educational goal of "one, two, three and four" metalworking practical training course, stimulates students' ambition, improves their learning purpose, and solves the problems of unclear learning goals and lack of learning motivation. Two lines simultaneously, offline r&d fingertips gyro tomahawk, the hero training subjects, such as research and development of online 3 d virtual simulation training, VR practice base, teaching resources, interactive learning, assessment and examination platform, make online thus all-round teaching platform, solve the field risk is high, the lack of processing equipment, solving the problem of students how to learn, to learn something; The three-way integration exercises a diversified and structured teaching team of training teachers, professional teachers and enterprise mentors to provide teacher support for the implementation of the fundamental task of moral education and four-step talent training; The four-step progressive talent training mode of "basic teaching practice training → interest class group training → elite class intensive training → competition group intensive training" is constructed to solve the problem of precise training of layered teaching and meet the needs of students to learn and learn well. Perfect appraisal mechanism, from the basic skills, innovation and development, the social responsibility of three dimensions, the design of nine secondary 27 three-level index, evaluation index and the implementation of three dimensional triple element can pay equal attention to examination evaluation system and to evaluate relatively objective element can pay equal attention to students, solve practical evaluation scope is not complete, not the classification evaluation.

In the past six years, students' application ability, innovation ability, professional quality and professional dedication have been significantly improved. They have won 84 awards and 25 authorized patents in national and provincial scientific and technological innovation competitions. Within three years after graduation, the number of students who grow into technical experts has increased significantly, and a large number of outstanding graduates have emerged.57 of the graduates have been awarded as model workers and technical experts. They have participated in more than 300 technological innovations of enterprises and transformed 43 innovative achievements. The group has approved 6 scientific and technological achievement transformation and technology transfer bases of colleges and universities in Shandong Province, key laboratories above the municipal level, engineering centers and other scientific research and innovation platforms.

2. The Main Teaching Problems Solved

2.1. Students have Unclear Learning Objectives and Lack Motivation

Students who take part in metalworking practice training are usually freshmen. They have no clear learning goals and lack sufficient motivation for learning. The 4-week metalworking practice training often goes through the formalities and gains little.

2.2. The Practical Training Project is Outdated and out of Touch with Production Reality

Traditional metalworking practice training often choose step shaft, special-shaped plate and other subjects irrelevant to students' real life, practical training results are often semi-finished, students can not understand its function, little interest; And the training subjects remain unchanged for many years, unable to keep up with the development trend of The Times, divorced from the reality of production.

2.3. The Talent Training Mode Is Single, and There is no Stratified Teaching.

A set of tutorials for the world, a standard assessment of all people. The talent training mode is single, unable to realize the student-centered teaching in accordance with their aptitude, and has not formed a set of effective precise talent training mechanism.

3. The Solution to the Problem

3.1. Ideological and Political Guidance and the Fundamental Task of Moral Education

Guided by the ideological and political construction of the course, the educational goal of "1234" metalworking practical training course is constructed. To foster "modern craftsmen" for the general objective, supported by "thick Germany, fine technology", to cultivate students "safety, innovation and standard" behavior and "work, dedication, artisans, industrial patriotic" four spirit. " Integrate the craftsman spirit into the ideological and political education and teaching of the whole curriculum, and train high-quality technical and skilled personnel as their own responsibility. " [4]inspire students' desire to do better, improve the learning purpose, solve students' goal is not clear, the problem of motivation lacking.

3.2. Connect Positions and Create a Teaching Platform Combining both Lines and Lines

Develop offline training programs and online teaching platforms according to the requirements of technical fields and vocational positions. Offline research and development of fidget spinner, hero Tomahawk and other popular training subjects of students; Online research and development of 3d virtual simulation training, VR training base, teaching resources, interactive learning, examination and other teaching platforms. Double line simultaneously, the combination of virtual and real, to solve the practical operation of high risk coefficient, insufficient processing equipment and other problems, to solve the students how to learn, what to learn.

3.3. Three-Way Integration, to Temper the Structured Teacher Team

School-enterprise cooperation, the establishment of training teachers, professional teachers, enterprise mentors "three integration" teacher team. Practical training teachers are the main force,

developing practical training subjects that students are interested in, carrying out practical training and ideological and political education, improving students' general skills and moral education level; Professional teachers for interest classes, elite classes, set up advanced CNC machining training classes, CNC and 3D modeling training for students, for students to lay a foundation for promotion; Corporate engineers, as mentors of enterprises, enter the training class to increase students' understanding of reality and society, improve students' self-positioning ability, and then generate model power and stimulate learning motivation by teaching stories about enterprise innovation and entrepreneurship and design and manufacturing. To implement the basic task of moral education, four-step talent training to provide teacher support. Let the education of higher vocational colleges "truly meet the needs of the market and the needs of enterprises, and train students into practical application talents with high quality, hard ability and knowledge of innovation.[5]

3.4. Precise Training and the Establishment of a Four-Step Progressive Talent Training Model

According to the concept of talent training, a four-step progressive talent training mode of "basic teaching practice training → interest class training → elite class intensive training → competition group intensive training" is constructed. To fully demonstrate the no child left behind and for teaching, on the basis of dialectical relationship of all, the standard according to the hierarchical teaching, expansibility principle, have a purpose, for, systematically developed a fourth-order progressive hierarchical teaching, group training of talent education and selection model, solve the problem of precision training, meet the needs of students, I have to learn to learn. Figure 1 shows the teaching mode of the course.

3.5. Improve the Assessment and Implement the Three-Dimensional Three-Level Assessment and Evaluation System

To support the four-stage progressive talent training mode, from the three dimensions of basic skills, innovation and development, social responsibility, the design of 9 second-level evaluation indicators, such as skill operation, competition, safety, standard and 27 third-level evaluation indicators, such as dimensional accuracy, team cooperation, relatively objective evaluation of students' basic ability. To solve the problems of incomplete scope and classification of practical training evaluation.

4. Innovation of Achievements

4.1. Straighten out the Ideological and Political Education Objectives of "1234" Course

With the general goal of cultivating "modern craftsman" and the support of "virtue and fine technology", the school aims to cultivate students' behavior habits of "safety, innovation and standardization" and four spirits of "labor, dedication, craftsman and industry serving the country". It fully embodies the student-centered, teacher-led, “construct the student-centered teaching mode and improve the quality of training talents. "[6]

seamlessly and accurately integrates ideological and political elements, imperceptibly improves students' interest in practical training and motivation for fine technology innovation, and helps students to establish craftsman spirit and improve their moral education level.

4.2. A New Team Building Mechanism of "Three-Way Integration" was Established

Training teachers, professional teachers, enterprise mentors diversified integration, to build a teaching team. Through the training teachers' basic training classes, students start to make the workpiece they are interested in, and acquire basic mechanical materials and processing knowledge; Through professional teacher training, students who are interested in 3d modeling, CNC processing and production knowledge can obtain the opportunity to become high-end CNC technicians and designers; Through face-to-face communication with engineers and designers of enterprises, students have a personal experience of society, enterprises and future positions. The formation of the three-way integrated team construction mechanism is conducive to building the teaching system of the lower, middle and third levels to meet the different development needs of students of different levels and interests.

4.3. A New Talent Training Mode of "Four-Step Progression" has been Formed

Creatively proposed a four-step talent training mode of "basic teaching practice training → interest class group training → elite class intensive training → competition group intensive training" to solve the problem of precision training. Forming a new mechanism of numerical control machine addition and 3D design talent education and selection by stratified teaching and group training, to meet the needs of students to learn, to learn well.

5. Promotion and Application Effect of the Results

Remarkable achievements have been made in personnel training. In the past three years, a large number of excellent graduates of Germany and technology have emerged. Students' application ability, innovation ability, professional quality and dedication have been significantly improved. They have won 84 awards and 25 patents in various national and provincial competitions. Put forward on-site improvement proposals and carried out more than 100 technological innovation projects in enterprises, participated in more than 300 technological innovation of enterprises, and transformed 43 innovation achievements;57 graduates were awarded as model workers and excellent employees. Universities and enterprises carry out in-depth training of innovative talents, realizing the layered and precise training of talents, and innovative talents are. highly praised by cooperative enterprises.

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