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The Exploration and Practice of Enterprise Oriented Training Project of NC Programming and Machining Technology

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Abstract: The training course of NC programming and machining technology plays an important role in improving students' engineering practice ability. Integrate the enterprise production process

Combining the production and inspection standards with the practical training teaching in Colleges and universities, this paper puts forward the enterprise oriented practical training teaching mode of NC programming and processing technology, which can effectively improve the effect of course practical training teaching, improve the enthusiasm and initiative of students' learning, and improve the engineering professional ability and professional practice level of college teachers.

Keywords: NC programming and machining technology; Practical training courses; Commercialization

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1.Introduction

With the formulation and implementation of the "made in China 2025" development strategy, the importance of manufacturing industry to national economic development has become increasingly prominent. In the process of China's transformation from "manufacturing power" to "manufacturing power", talents play a decisive role. With the development and application of Internet of things, cloud computing, artificial intelligence and other technologies, enterprises will have higher and higher requirements for talents, which requires not only a high professional and technical level, but also familiarity with enterprise production and operation.NC programming and machining technology training is a professional practical course. As a compulsory practical course for students majoring in mechanical engineering, it mainly enables students to master the planning ability of NC machining process procedures, programming ability and comprehensive operation ability of NC machine tools, and focuses on cultivating students' team cooperation spirit and innovation ability. It is a comprehensive skill practical course for college graduates majoring in Mechanical engineering before taking up their posts [1]. At present, the teaching content of NC programming and processing technology training is to design training items according to the knowledge points of teaching materials, and the teaching content is relatively simple; The traditional teaching mode of teachers' teaching and students' practice is adopted in class, and the mode is relatively single [2]. In addition, due to the limitation of the number of equipment and training site, the training effect of NC programming processing technology can not be guaranteed.

According to the actual situation of NC programming and machining technology training teaching at present, this paper analyzes the shortcomings existing in the teaching process, and puts forward an enterprise oriented NC programming and machining technology training teaching mode: combining the enterprise production process and production inspection standards with the college training teaching, so that students can have "machine" to talk about and application objects in the training process,

1.1 The training content is simple

In the training teaching of NC programming and processing technology, the training teaching content designed based on the knowledge points of teaching materials is too simple, does not consider the current knowledge and skill level of students, fails to teach students according to their aptitude, and the training items are the same. In addition, it is difficult to take care of students with poor foundation. The design of teaching cases is relatively simple, and only take the knowledge points required by textbooks as the standard, which can not achieve the effect of drawing inferences from one instance.

1.2 Single teaching mode

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In the process of practical training and teaching, the students' current "meeting" is the main training goal, regardless of whether they can meet the needs of enterprises for talents and society after graduation. The teaching mode adopts the traditional teacher teaching and student practice mode. The teaching mode is single. Students do not pay attention to self summary in the process of practical training and learning, and lack the ability of thinking expansion and teamwork[3].

1.3 Teachers lack practical experience

The source of college teachers is relatively single, and most of them are from school to school. Although the theoretical level is high, they lack professional and practical experience. They have no on-site work experience in enterprises, and many professional knowledge is "on paper". In addition, teachers are not familiar with enterprise production flow.

Fund Project: key project of research and practice of higher education teaching reform in Henan Province; Research project on education and teaching reform of Xuchang University; New engineering research and practice project of Xuchang University .Enterprise oriented training project.

2.Background

2.1 Teaching concept

Enterprise training teaching refers to the establishment of a virtual enterprise in the teaching process, the simulation of the training process into the enterprise production process, the creation of a simulated learning environment and working methods, so that students can perform their respective duties in a "simulated" enterprise, carry out learning activities, and work together to complete work tasks, Realize the transformation from "learning field" to "enterprise workplace". Student assessment abandons the original way of "practice + work", takes diversity, process and quantification as the core, and takes students' skills, quality and ability as the main evaluation content, so as to build a process and comprehensive evaluation and assessment system based on enterprise production standards.

2.2 Teaching mode

Teacher student relationship of "apprenticeship system".Implement the teaching of "teacher apprenticeship system" and form a "helper" effect through teachers' guidance. Teachers and students take courses as the link, training equipment and training venues as the platform, teachers teach "impart skills", students operate "learning skills", and determine whether students can "pass the customs" through assessment. At the same time, assessment is used to evaluate teachers' "apprenticeship level".[4]

The implementation of the "apprenticeship" teaching model is closer to the actual production of enterprises and can effectively improve the teaching quality [5].

"Interoperability" school enterprise relationship

Enterprise oriented practical training requires that teaching should be close to enterprise production, conform to enterprise production reality, and have high requirements for teachers' professional quality and practical experience. The implementation of "interoperability" learning complements each other's advantages. Through the exchange of learning between training teachers and enterprise engineers, teachers are put into enterprise production, and enterprise engineers go to school, which can not only enable enterprise engineers to learn theoretical knowledge, but also improve the practical ability and professional level of training teachers, make training teachers dare to explain in depth and realize the commercialization of teaching content, Teachers' demonstration operation should be standardized and standardized.

2.3 Instructional design

The construction of enterprise oriented practical training teaching system inevitably requires that the teaching process conform to the actual mode of enterprise production. Firstly, the teaching content is designed according to the production standards of the enterprise. The training objects are from the production line of the enterprise. The drawings used in the training are the actual production drawings of the enterprise after transformation, so as to make them meet the processing requirements of school teaching equipment. Then, realize the "six step" teaching method in the training teaching process, that is, release tasks, prepare process cards, process audit and program verification, part trial cutting, precision measurement and evaluation feedback, embody "enterprise" everywhere, and complete different training tasks in each stage. The design of the training teaching process corresponds to the enterprise production process one by one [6]

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2.4 Teaching process

The enterprise oriented training teaching is completed by college teachers and enterprise engineers to realize the overall transformation from training teaching to enterprise production. Among them, the enterprise engineer acts as the chief engineer of the training project and is responsible for issuing the overall training tasks; College teachers serve as deputy chief engineers and team leaders as technicians, responsible for the arrangement of production process; The team leader acts as a programmer and is responsible for programming the parts to be processed in the training project; The team members act as technicians and quality inspectors, and are responsible for operating machine tools to process parts and inspecting the quality of processed parts. Teachers and students play their respective roles in the whole production process of the enterprise, perform their respective duties, and jointly complete the enterprise training and teaching project. [7]

2.5 Assessment and evaluation

The assessment and evaluation contents include operating skills, personal quality, team cooperation and communication. The assessment standards of enterprise production are adopted. The assessment and evaluation contents include skills, quality, ability and other aspects, as well as team cooperation, communication and coordination. The enterprise oriented practical training and teaching project is implemented. In the assessment and evaluation, we should pay attention to cultivating students' quality awareness and require students to learn the detection and evaluation of parts. At the same time, in the process evaluation, we should assess students' ability to solve problems such as fixture design, debugging and tool wear, so as to improve students' ability to solve practical problems.

In general, the formula of total assessment score is: total assessment score = part accuracy inspection (60%) + personal process evaluation (30%) + team cooperation evaluation (10%).

Team cooperation evaluation mainly assesses students' personal investment in the team and communication with team members in the production process of enterprise training projects. The scores generated by self-evaluation scores, mutual evaluation scores and teacher evaluation are combined in a certain proportion [8].Teaching implementation.

3.Conclusion

3.1 Teaching examples

After the teaching improvement of enterprise production parts, the effect is obvious. As a practical training content of NC programming processing, drawings include the complete working process of machining parts, such as part machining process specification design, tool and gauge selection and use, machining programming, use of CAD / CAM simulation software, operation of machining center, part machining and precision detection of parts [9].

3.2 Project implementation

The enterprise oriented training project was first implemented in class 1 of mechanical design, manufacturing and automation major of undergraduate level 18. At this time, the students are in the second semester of junior year, and most of the professional courses have been studied, so they have the theoretical basis to participate in the training of NC programming and processing technology. Before the training, all students in the class are divided into four groups. Group 1 and 2 are led by two college teachers and use the original

Under the leadership of a college teacher and an enterprise engineer, the new teaching cases are used to implement the enterprise training project to complete the teaching.

3.3 Assessment and evaluation

On the basis of the original evaluation of part accuracy only, the assessment of students' process assessment and team cooperation assessment are added. The specific assessment standards and contents are shown in Table 1. Finally, the final training score is obtained according to the calculation method of the total assessment score.

Training projects, the implementation of traditional training teaching; Groups 3 and 4 are composed of one

3.4 Effect comparison

By comparing the results of class 1 of grade 18 machinery in participating in the NC programming and processing technology training, combined with the questionnaire survey and statistical results of students and enterprise engineers and teachers participating in the training, group 3 and 4 are higher than group 1 and 2 in terms of training

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results and evaluation of teachers and enterprise engineers. Students can make full use of their time in the training process, Be able to learn and master knowledge independently and solve technical problems encountered in the production process.

In the context of engineering education, the implementation of enterprise oriented practical training teaching courses for the practical training of "NC programming and processing technology" can effectively improve students' enthusiasm and initiative, meet the school running goal of cultivating applied talents in engineering colleges, improve students' professional ability and engineering literacy, and improve the employment rate of mechanical majors of college graduates, Improve the fit between students' ability and the needs of enterprises

To the recognition of enterprises and even society.

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