

Research and Implementation of Teaching Design of Special Processing Technology

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ABSTRACT

Professional courses are an important link for vocational college students to learn professional knowledge and cultivate professional skills. The construction of practical training courses in higher vocational colleges plays an important role in the process of talent training. Taking the construction of provincial high-quality course "special processing technology" as an example, this paper focuses on the design ideas, content selection, course content organization, as well as the design of teaching methods and means of higher vocational training courses, which has reference and reference significance for the construction of other courses.

Keywords: Curriculum; Practical training; Teaching design

1. INTRODUCTION

Instructional design is a subject that involves understanding and improving the teaching process. The purpose of any design activity is to put forward the best way to achieve the expected purpose. Therefore, teaching design is mainly a subject about putting forward the prescription of the best teaching methods, which can make the expected changes in students' knowledge and skills. In short, it can be understood that teachers systematically plan, arrange and make decisions on teaching activities in order to achieve certain teaching objectives.

Special processing technology is a provincial excellent course of Qingdao Vocational and technical college and one of the core courses of numerical control technology specialty. As the person in charge and lecturer of the excellent course, the author has actively explored the teaching design of the course in the course construction, which is introduced as follows.

2. CURRICULUM DESIGN IDEAS

Qingdao Vocational and technical college implements the school running concept of "Teaching & learning for application", adheres to the school training of "cultivating ability and applying", establishes the talent training mode of "reality coupling", and tries to realize the integration of "teaching, learning and research" under this school running concept; At the same time, create a typical enterprise environment in the school to realize the close combination of teaching and learning, so that the practical teaching work does not strictly depend on the business community. In the school, we can realize the organic combination of theoretical teaching and practical teaching, and finally achieve the goal of cultivating students' practical ability and improving students' professional quality.

The purpose of the course of *special processing technology* is to train special processing technology talents to meet the needs of enterprises for the production front line of modern manufacturing industry in Qingdao. In the course design process, we adhere to the guiding principle of "Teaching & learning for application". Before the course is opened, we use the way of "school enterprise cooperation to build the course", through industry experts Enterprise technicians and course group teachers jointly analyze the professional posts of *special processing technology* specialty and analyze the professional core competence based on the post; Formulate the curriculum scheme of special processing technology according to the core competence; Then select the corresponding teaching content and design the teaching mode.

Special processing technology is not only a core course in the vocational skill learning field of NC Technology Specialty in our college, but also an important type of work. Its leading courses are "NC turning", "mechanical CAD/CAM software application" and "NC milling (machining center) machining", and its follow-up courses are "assembly machining", post practice, etc. The course is a practical professional course directly facing the majors of numerical control technology, mold design and manufacturing and mechatronics. The practical teaching link of the course relies on the "Qingdao Higher Vocational Education Training Base" of our college. The skill training based on this is a practical teaching based on real equipment. After learning this course, students can participate in the corresponding vocational qualification certificate examination and obtain the corresponding qualification. After graduation, I can be engaged in the corresponding work of NC EDM machine tool and NC wire cutting.

3. COURSE CONTENT SELECTION

Special processing technology adopts the way of joint curriculum development between schools and enterprises,

highlights "taking the improvement of students' ability as the core" in the selection of curriculum design, and fully embodies the teaching mode of taking students as the main body and teachers as guidance. The content of the project selection "comes from reality and serves teaching" and conforms to "students' cognitive law".[1][2]

In order to meet the needs of employers in special processing technology industry for talents, combined with the knowledge, ability and quality requirements required by the actual work tasks of professional posts, the research group selected and optimized the course content through

the mode of "joint construction of courses by schools and enterprises", constructed a new theoretical and practical teaching system, and integrated, optimized and reorganized the teaching content. According to the training objectives of skilled professionals, post requirements and the connection of previous and follow-up courses, combined with the actual situation of our college, the teaching contents of each teaching link are considered and selected in an overall manner to the extent of necessary and sufficient.[3][4]

Table 1. Learning Situation and Teaching Content

Study Field	Sign	Learning situation	Class hours	Credit	Assessment Mode
Special Processing Technology	1	EDM machining of drill bit and tap broken into workpiece	16	4	Project process assessment includes knowledge and skill quality
	2	EDM of logo pattern cavity	10		
	3	EDM of mobile phone cavity	8		
	4	Turning tool WEDM	12		
	5	WEDM machining of angle template	10		
	6	WEDM of blanking female die	8		
Total class hours			64		

With typicality, coverage, practicability, feasibility, interest and challenge, and based on the cognitive law, six projects are designed: (1) EDM machining of drill bit and tap broken into workpiece; (2) EDM of logo pattern cavity; (3) EDM of mobile phone cavity; Wire cutting project: (1) turning tool wire cutting processing; (2) WEDM of angle template; (3) blanking female die wire cutting EDM, and other special machining technology projects are briefly introduced. As shown in Table 1.

On this basis, we design corresponding teaching situation documents for each project. Each situation includes: learning objectives, skills objectives, and students' social ability development objectives.

4. COURSE CONTENT AND ORGANIZATION FORM

The organization form of course content is shown in Figure 1. On our course, we organize the teaching content according to the principle of from easy to difficult and from simple to complex. The goal of our training is to make students transition from the level of primary workers to the level of intermediate workers and skilled workers. First, reach the level of junior workers through project 1, intermediate workers through project 2, and skilled workers in project 3. When we study the course, the difficulty of the project gradually increases, the role of teachers changes from changeable to less, the content of teachers' guidance gradually decreases, the students' learning ability is gradually strengthened, and the students have considerable independent learning ability after learning.

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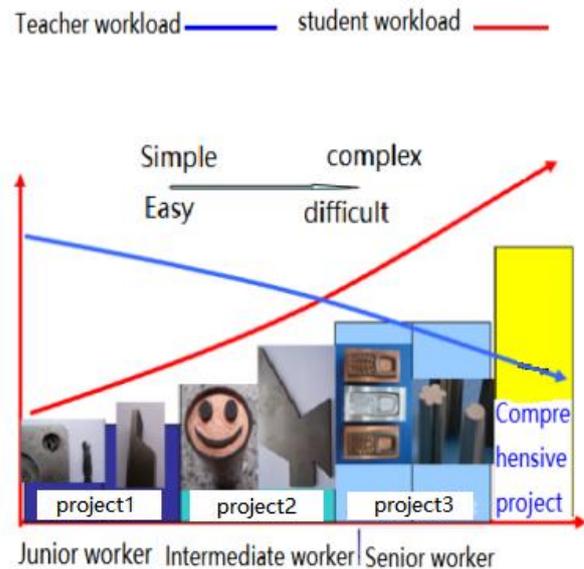


Figure 1. Course content organization

5. TEACHING METHOD DESIGN

After the teaching design, we have adopted the corresponding teaching methods to implement the teaching. In our special processing technology teaching, we have adopted rich teaching methods guided by the project and driven by the task.

5.1. Teaching methods of theory course

In the teaching process of theory course of this course, we have adopted a variety of flexible and advanced teaching methods to ensure high-quality completion of teaching tasks:

- 1) In the process of theoretical teaching, according to the characteristics and training purpose of the course, the problem-based learning organization mode, case teaching and project teaching are mainly adopted to strive to realize the teaching mode of "task leading, project driving, real situation and learning and doing supplemented", so as to improve the learning effect of students.
- 2) Theory teaching is mainly based on multimedia courseware, and the actual operation process of teachers is dynamically displayed by large screen projector; At the same time, supplemented by the traditional teaching method of blackboard and chalk, so that students can keep up with the key steps of lectures, so as to help students understand and master relevant contents.
- 3) Guide students to make full use of the Internet for learning, such as browsing or downloading electronic teaching plans through the Internet, understanding teaching arrangements and course contents, so as to achieve targeted learning. Students can also make full use of websites or e-mail to communicate and discuss with teachers.
- 4) Part time teachers of enterprises are invited to give technical lectures for students to clarify their learning objectives, mobilize their learning enthusiasm and transform from passive learning to active learning.

5.2. Teaching methods of practice course

In the process of practical teaching, in order to improve students' practical ability and practical ability, many teaching methods such as task driven and project guidance are mainly used in the process of practical teaching, so as to understand the teaching content and deepen the teaching effect through the analysis and discussion of the project.

- 1) In the design of project-based teaching methods, it has changed from teacher-centered to student-centered, from textbook centered to "project" centered, and from classroom centered to practical training centered. In the design, it emphasizes that students are the subject of cognition and the active constructor of knowledge meaning.
- 2) Operation demonstration. Focus on the current knowledge points to facilitate students' requirements of

"knowledge transfer", select appropriate small projects and demonstrate the process of solving the projects.

- 3) Problem oriented and independent exploration. Let students think independently, understand the knowledge points and digest the requirements of the demonstration project.
- 4) In class, students are arranged in groups and team leaders are rotated. The application of these means effectively improves the utilization efficiency of equipment.
- 5) Outside the classroom, students plan and carry out learning projects by themselves in the form of interest groups or associations, and flexibly apply the contents of classroom learning outside the classroom, which greatly improves students' enthusiasm for autonomous learning and truly realizes the teaching concept of "Teaching & learning for application" of our college.
- 6) Part time teachers of enterprises are invited to teach students in enterprises to achieve the effect of "reality coupling".

6. DESIGN OF TEACHING MEANS

6.1. Teaching methods of theory course

In classroom teaching, students consult materials in groups to discuss and complete the planning of the project; Teachers adopt the problem-based learning teaching method and complete the processing of workpieces with the joint efforts of teachers and students; After having the corresponding vocational qualification ability, students complete the vocational skill appraisal independently. In addition, part-time teachers cultivate students' sense of teamwork and enable students to establish the awareness of abiding by corresponding post responsibilities by explaining corporate culture in classroom teaching activities.

Students' extracurricular time is much more than their learning time in the classroom. Therefore, we actively mobilize students' enthusiasm for extracurricular learning and achieve good results. Students' extracurricular learning is embodied in: under the guidance of teachers, students independently complete various activities carried out by interest groups; Every year, students participate in various numerical control skill competitions in the form of school training, selection, independence or team; Under the guidance of part-time teachers of the enterprise, process the products of the enterprise in the form of combination of work and study, and solve the practical problems of the enterprise with the joint participation of full-time and part-time teachers and students.

6.2. The classroom organization adopts the mode of group teaching and team leader rotation

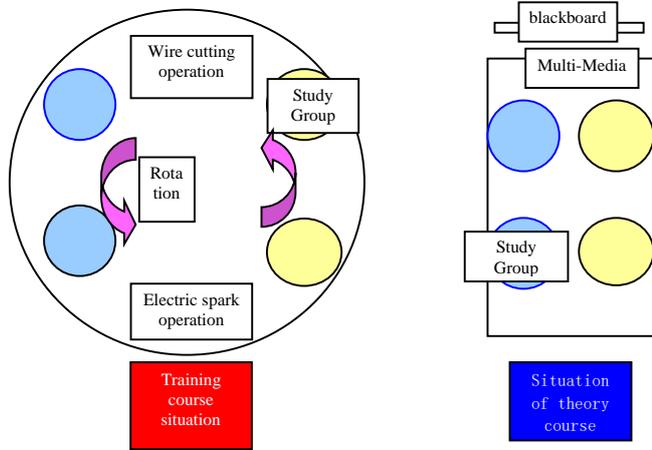


Figure 2. Group teaching situation design

In theory class, in order to facilitate students' discussion, students' tables and chairs are arranged in groups; In the training course, in view of the characteristics of less equipment and more projects in the teaching of special processing technology, we adopt the method of group teaching, which can solve the problem of insufficient equipment resources and improve students' team spirit and learning efficiency. In order to ensure that every student can get sufficient training opportunities in the learning process, we implement the team leader rotation system, and give full play to the leading role of the team leader in the project implementation process, so as to realize the teaching mode of team leader taking the lead and team members following up; During the implementation of the project, teachers should give appropriate guidance and check at any time. At the end of the project, each student should submit a project report. Through the report, teachers can understand the knowledge of students.

During the implementation of the above teaching means, it highlights the students as the main body, fully mobilizes the students' learning enthusiasm, improves the students' technical application ability, and well cultivates the students' innovative consciousness and sense of achievement, which is generally welcomed by the students. After the above teaching design, the course of special processing technology has achieved good teaching results in the teaching process, and successfully passed the

provincial excellent course evaluation. Its teaching design ideas can be used for reference to the teaching modes of other higher vocational training courses.

7. SUMMARY OF MAIN FEATURES AND INNOVATIONS OF THE COURSE

Teaching philosophy: schools and enterprises jointly develop courses, and the content of project selection highlights the "cognitive law based on students". This course adopts the mode of joint curriculum development between schools and enterprises. In the selection of curriculum design, it highlights "taking the improvement of students' ability as the core", which fully reflects the teaching mode of students as the main body and teachers' guidance.

Teaching organization: combine classroom teaching with extracurricular teaching. In class, students are arranged in groups and team leaders are rotated. The application of these means effectively improves the utilization efficiency of equipment. Outside the classroom, students plan and carry out learning projects by themselves in the form of interest groups or associations, which greatly improves students' enthusiasm for autonomous learning and achieves good teaching results.

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