

Project-oriented teaching of "CNC Technology" course based on applied talent cultivation

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Abstract. This study aims to investigate the effectiveness and implementation strategies of project-based teaching in the course of "CNC Technology" based on the cultivation of applied talents. Through project practice, cultivate students' practical abilities and application skills to improve their overall quality and employment competitiveness. The expected research results can verify the adaptability and effectiveness of the teaching mode based on the cultivation of applied talents in the course of "CNC Technology", and determine the positive impact of project-based teaching on the cultivation of students' practical ability and application skills. The research will propose design and implementation strategies suitable for project-based teaching in the course of "CNC Technology", providing reference and reference for teachers' teaching. Through the promotion of research, experience and guidance can be provided for the teaching reform and talent cultivation of related courses.

1. Introduction

In response to the demand for applied talents in today's manufacturing industry, as well as the characteristics and training objectives of the "CNC Technology" course, this study aims to explore the effectiveness and implementation strategies of project-based teaching for the "CNC Technology" course based on the training objectives of applied talents in our school. Through project practice, cultivate students' practical operation skills and problem-solving abilities, in order to improve their overall quality and employment competitiveness.

2. Research Objectives

Exploring the applicability of the teaching mode based on applied talent cultivation in the course of "CNC Technology", and analyzing the effect of project-based teaching on improving students' skills, in order to propose a project-based teaching design and implementation strategy suitable for the course of "CNC Technology". The research on project-based teaching in the course of "CNC Technology" based on applied talent cultivation is committed to achieving the following goals:

2.1. Determine teaching objectives

Clarify the goals and expected outcomes of project-based teaching in the course of "CNC Technology", including cultivating students' practical operation skills, problem-solving abilities, and teamwork abilities[1].

2.1.1. Define the type of teaching objectives

Determine the type of teaching objectives based on their different levels and nature. Teaching objectives can be divided into knowledge objectives, skill objectives, and attitude objectives. For the course 'CNC Technology', the knowledge goal can be to understand the basic principles and related knowledge of CNC technology, the skill goal can be to master CNC programming and operation skills, and the attitude goal can be to cultivate students' awareness of self-directed learning and teamwork.

2.1.2. Analyzing the characteristics of the subject and the needs of students

Analyze the course and student group of 'CNC Technology' to understand the characteristics and industry needs of the subject, as well as the background and development needs of students[2]. Explore the latest developments and technological trends in the subject field, in order to clarify the alignment between teaching objectives and actual needs.

2.1.3. Develop specific teaching objectives

Develop specific teaching objectives based on the type of teaching objectives and subject characteristics. The teaching objectives should be quantifiable, observable, and evaluable, with clear behavioral performance and standards. For example, the knowledge goal can be to proficiently master CNC programming language and related knowledge; The skill goal can be to be able to

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design and write CNC programs for different workpieces; The attitude goal can be to cultivate students' professional literacy and teamwork spirit.

2.1.4. Related practical application scenarios

Associate teaching objectives with practical application scenarios to ensure that students can apply their knowledge and skills to practical engineering and projects[3]. Through project practice and the introduction of practical cases, students can experience and practice the skills and knowledge they have learned in practical applications.

2.1.5. Regular evaluation and adjustment

Regularly evaluate students' learning outcomes and ability development, and adjust and revise teaching objectives based on the evaluation results. Evaluate students' achievement of various teaching objectives through course assignments, comprehensive practical projects, internship reports, and other forms, and adjust teaching objectives based on the evaluation results to continuously improve teaching quality and students' learning outcomes.

2.2. Design teaching mode

Develop a project-oriented teaching model suitable for the cultivation of applied talents, combining theoretical knowledge with practical operations, and cultivating students' comprehensive application abilities.

When designing teaching models, take specific projects as the guide, design project tasks and goals, and closely integrate project content with the learning objectives of the course. Students engage in practical operations and problem-solving in projects, and through the implementation of actual projects, cultivate their practical abilities and application skills. Through practical activities and experimental operations, students are encouraged to personally participate in the practical operation and application of CNC technology. Design practical tasks and demonstration cases to enable students to master the use of CNC tools and equipment in practice, and carry out actual machining assignments. Organize student groups to collaborate in small teams and complete project tasks related to CNC technology through collaboration. In teamwork, students can learn, collaborate, and communicate with each other, cultivating teamwork and problem-solving abilities. Arrange students for internship and practical training, and conduct practical operations and activities in relevant enterprises or laboratories. By participating in practical work scenarios, students can better understand and apply CNC technology, and improve their practical operation abilities. Select practical cases related to CNC technology, organize students to conduct case analysis and design solutions[4]. By analyzing practical cases, students can understand the application of CNC technology in different scenarios, deepen their understanding of knowledge and application abilities.

2.3. Optimizing teaching content

Applying project-oriented teaching to the course of "CNC Technology" focuses on cultivating students' practical operation and problem-solving abilities through the design and implementation of practical projects.

When optimizing teaching content, practical cases are introduced to combine course content with actual engineering projects, enabling students to understand and apply CNC technology in practical scenarios. Cultivate students' practical application abilities through analyzing practical cases, designing solutions, and practicing practical operations. Use real workpieces for machining in teaching, allowing students to personally operate CNC machine tools for machining. Through practical operation and experience, students can better understand the application and steps of CNC technology, and cultivate their practical operation and problem-solving abilities. Design innovative project tasks and encourage students to engage in innovative design and technical improvement within the project. Through the design and implementation of actual projects, stimulate students' innovative thinking and practical abilities, and improve their ability to respond to practical problems. In addition to the basic knowledge of CNC technology, it should also include industry related knowledge, such as process flow, machine tool selection, tool selection, etc. Through theoretical and case studies, students can have a more comprehensive understanding of the application and limitations of CNC technology in practical production. Integrate CNC technology with other disciplines, such as materials science, mechanical design, automation control, etc. Through interdisciplinary learning, students can have a more comprehensive understanding of the application fields and related knowledge of CNC technology, providing a broader perspective for the cultivation of applied talents.

2.4. Evaluating Teaching Effectiveness

By evaluating and comparing the differences between traditional teaching models and project-based teaching models, evaluate the improvement of students' comprehensive abilities and practical operation levels.

When evaluating teaching effectiveness, evaluate students' comprehensive abilities in project-based teaching, including practical operation ability, problem-solving ability, team cooperation ability, etc. Students' comprehensive abilities can be evaluated through the evaluation of practical works, analysis of practical reports, and observation and recording during the practice process. Evaluate students' learning outcomes in terms of CNC technology knowledge and skills. Students' learning outcomes can be evaluated through course performance, exam scores, and the quality and completion of course assignments. Collect students' feedback and opinions on project-based teaching, and understand their views and feelings on the teaching mode and content. Students can be solicited for evaluation and improvement suggestions on teaching effectiveness through questionnaire surveys, discussion

groups, and individual interviews. Compare and evaluate the abilities and knowledge gained by students in project-based teaching with the industry's demand for applied talents. By collaborating with enterprises, evaluating industry experts, and providing employment feedback, we can understand students' performance and application abilities in practical work, thereby evaluating teaching effectiveness[5].

2.5.Enhancing Student Competitiveness

Cultivate students' application and innovation abilities in the field of CNC technology, and improve their competitiveness and employment opportunities in the industrial field.

In terms of enhancing students' competitiveness, through project-based teaching, students will have the opportunity to participate in practical CNC projects and practical activities, improving their practical abilities and application skills. This enables students to better adapt to the actual work environment, possess the ability to solve practical problems, and thus become more competitive in the job market. Project oriented teaching encourages students to collaborate in teams, and students need to work together with other team members to solve problems in the project. Through the experience of collaborating with others, students are able to cultivate teamwork and communication skills, which are essential abilities in real-world work environments. Project oriented teaching emphasizes students' ability to think independently and solve problems. Students face practical problems in the project and need to apply the knowledge and skills they have learned to solve them. Through such practical experience, students can cultivate innovative thinking and problem-solving abilities, improving their competitiveness in work scenarios. Project oriented teaching enables students to have direct access to real CNC equipment and processes, and master practical operational skills. This practical experience can improve students' skill level and enable them to quickly adapt and apply CNC technology in practical work.

2.6.Promotion and Implementation Strategies

Research the implementation strategy of project-based teaching, provide reference and reference for other similar courses, and promote teaching models based on the cultivation of applied talents.

In terms of promotion and implementation strategies, provide training and guidance to teachers to help them understand the concept and methods of project-based teaching, and master corresponding teaching skills. Support teachers in designing and implementing project-based courses, providing teaching resources and cases to improve their teaching abilities and quality. Ensure that there are sufficient student resources to form groups and conduct project practice. Provide students with necessary equipment, tools, and laboratory resources to support their practical operations and learning in the project. At the same time, encourage students to learn and think independently, cultivate their innovative spirit and

problem-solving ability. Redesign and adjust course content to better meet the needs of project-based teaching. Integrate practical cases and project tasks into the curriculum, and enhance students' practical abilities and application skills through practical activities and practical operations. Continuously improve and optimize the curriculum based on student feedback and evaluation results. Establishing cooperative relationships with relevant enterprises, providing students with internship opportunities and practical projects. By collaborating with enterprises, students can be exposed to the actual needs and application scenarios of the industry, increase their employment competitiveness, and gain practical experience and industry recognition[6].

Through the exploration and implementation of the above research objectives, theoretical and practical foundations can be provided for project-oriented teaching of the course "CNC Technology", promoting the cultivation of applied talents and the improvement of practical abilities. At the same time, it provides reference and guidance for the reform of teaching models and educational research in other related courses.

3. Research methods

Summarize and organize the research results and experiences on teaching models and project-based teaching based on applied talent cultivation both domestically and internationally. Investigate students' views and feedback on traditional and project-based teaching to understand their needs and expectations. Design and implement project-based practical activities to cultivate students' practical skills and problem-solving abilities. Evaluate the effectiveness of project-based teaching through student evaluation, performance evaluation, and other methods. When conducting research on project-oriented teaching of the course "CNC Technology" based on the cultivation of applied talents, the following research methods can be adopted:

3.1.Literature Review

By conducting a comprehensive analysis and theoretical summary of literature in relevant fields, we aim to sort out and understand the research results and practical experience of teaching models and project-based teaching based on applied talent cultivation.

3.2.Questionnaire survey

Design and distribute a questionnaire survey targeting different participants such as students, teachers, and businesses to understand their views and feedback on traditional and project-based teaching, as well as their needs and expectations for practical ability development.

3.3.Interview and Focus group discussion

Conduct individual interviews or organize Focus group discussions with teachers and students to deeply

understand the actual effect of project oriented teaching and the specific application of teaching methods, and collect relevant practical experience and teaching feedback.

3.4. Teaching Practice

Design and implement project-based practical activities to cultivate students' practical abilities and application skills. By recording and observing the actual teaching process, collecting data, and examining students' learning situation and ability improvement during the practical process, as well as their problem-solving ability[7].

3.5. Effectiveness Evaluation

Evaluate students' learning effectiveness and ability improvement in project-based teaching based on teaching objectives and evaluation indicators. The effectiveness of project-based teaching can be comprehensively evaluated through experimental data analysis, work evaluation, practical reports, peer review, and other methods.

Through the organic combination of the above research methods, it is possible to comprehensively explore the implementation effect and teaching strategies of project-based teaching in the course of "CNC Technology" based on the cultivation of applied talents. At the same time, attention should be paid to the objectivity and reliability of data collection to ensure the scientific and credibility of research results.

4. Research Results

Verify the adaptability and effectiveness of the teaching mode based on application oriented talent cultivation in the course of "CNC Technology", demonstrate the positive impact of project-based teaching on students' skill improvement and practical ability cultivation, and propose design and implementation strategies suitable for project-based teaching in the course of "CNC Technology" during the research process, providing reference and reference for teachers' teaching.

5. Conclusion and Outlook

The project-based teaching of the course "CNC Technology" based on the cultivation of applied talents has important educational value and practical significance. Through comprehensive analysis and empirical research, this study will provide theoretical basis and practical guidance for the promotion and implementation of project oriented teaching mode in the course of "CNC Technology". However, attention should also be paid to the allocation of educational resources and teachers to ensure the smooth implementation of project-based teaching and the improvement of students' abilities. In the future, further in-depth research can be conducted to refine the specific methods and

effectiveness evaluation indicators of project-based teaching, continuously optimize and improve the teaching mode and content of the "CNC Technology" course, and make contributions to cultivating more high-quality and application-oriented engineering talents.

Acknowledgment

This project originates from the 2021 school level education and teaching reform research and practice project of Shenyang University of Urban Construction - the research and practice of project-based teaching for the "CNC Technology" course based on the cultivation of applied talents.

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