Teaching Exploration and Practice of Innovative Practical Course Configuration Monitoring Technology

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Abstract: Based on the background of the new engineering education reform, we should cultivate students' practical ability and innovative consciousness to the greatest extent by means of innovative development, coordinated integration and the introduction of a variety of teaching ideas. Configuration monitoring technology involves a variety of technical means including electromechanical control technology. It aims to help students complete the process basis from design and development to use. The reform of its teaching exploration and practice is conducive to further improve students' innovative and practical ability. Based on the successful experience of colleges and universities at home and abroad, we should reset the curriculum teaching structure, improve the classroom teaching means, and create new teaching ideas, so as to provide some reference for the development of innovative practical courses in the future.

1. Introduction

The Ministry of education put forward the guidance on the education reform of the new engineering in 2017. The new engineering aims to cultivate diversified talents with the basic goal of cultivating talents and the guidance of the future and science and technology as its construction concept. As a course integrating the theoretical teaching content into the practical teaching process, configuration monitoring technology aims to cultivate students' ability of innovation and autonomous learning, Constantly stimulate students' practical exploration and knowledge seeking ability, correct students' own learning and work ideas, and lay the foundation for cultivating professional talents in the future.

2. Research Background

2.1. Teaching Content of Configuration Monitoring Technology

Configuration monitoring technology is a course for manufacturing and production application, including PLC and electromechanical control technology. It has basic electrical knowledge such as electrical technology and electronic technology. It takes a complete project as the teaching content and integrates theory into practical teaching [1], with a total of 32 class hours, The selected textbook is the national "13th five year plan" planning textbook for ordinary colleges and universities "Kingview" published by the machinery industry press. As a highly applied course with a combination of professionalism, interest, practicality and application, it can bring beneficial help to students and work in the future.

After learning, students can directly take over the upper computer configuration of a practical project. The overall teaching process includes attendance, homework, computer examination and so on. By means of computer, the professor starts from the dazzle and development of control system architecture in theory, including the overview of monitoring configuration software and the performance index of force control configuration software, from the evolution and development of control system architecture, from the content expansion of unit combined instrument, computer (microprocessor) direct digital control (DDC), and from the description of new industrial control system hierarchy and Fieldbus software, On the basis of understanding and mastering the principle and use of configuration software, students are trained to have more perfect technical knowledge of computer configuration software. Lay a foundation for professional work in this field after graduation. In practice, the component monitoring guidance mainly includes the contents shown in Table 1:

Table 1: configuration monitoring technology - Experimental Instruction

Name of experimental project	type	Main learning contents
Experiment create simple project	verification	Learn the basic operation of kV, create PLC control configuration simulation, and create engineering
Experiment 2: Variables	verification	Fully understand the relationship between internal and external indirect variables
Experiment 3: Animation	verification	Be familiar with the animation process of the project, and the difficulty is script programming
Experiment 4: action	verification	Through experiments, master the functions of alarms and events
Experiment 5: curve	verification	Understand real-time curve and historical curve drawing
Experiment 6: Report	verification	Understand historical reports and draw universal reports

2.2. Current Research on Innovative Practical Courses

Innovation and practice courses are mainly designed to cultivate students' innovation and entrepreneurship ability and practical ability. They are mainly concentrated in engineering disciplines. Bao Peng [2] carried out innovative research based on the teaching mode of artificial intelligence practical courses. Starting from the teaching reform scheme of artificial intelligence practical courses, he discussed how to combine innovation with practice. Yu Jianyun [3] started from the innovation and entrepreneurship practice teaching of practical courses, so that students can improve their innovation consciousness and independent entrepreneurship ability through the study of advertising practical courses. Pu Weiguo [4] put forward the exploration ability of the ability training standard from the digital media art specialty. There is little research on configuration monitoring technology. Starting from "inheritance and innovation, integration and cross, coordination and sharing", Zhang Jingzhi [5] explored the teaching exploration and practice of comprehensive practice of configuration monitoring system with the main purpose of facing non

electrical engineering students and improving students' comprehensive practical ability and professional learning needs.

2.3. Problems in the Reform of Innovative Practical Courses

(1) The teaching of practical courses can not keep up with the development of policies and industries

Because "configuration monitoring technology" is a professional course based on computer-aided experiment, and now the practical teaching in many colleges and universities is too old, ignoring the development needs of the market, and does not better rely on the national policy background and the development needs of the industry, resulting in that students can not integrate well into the industry after going out.

(2) Lack of effective communication with the industry

The purpose and core of practical courses is for students to learn better after entering the workplace in the future. However, most innovative practical courses are set up inside the campus, and there is a serious disconnection between the content related to practice and after entering the enterprise. Therefore, colleges and universities should strengthen effective communication and exchange with the industry in teaching curriculum design

(3) Teachers lack the cultivation of innovative and entrepreneurial consciousness

In the process of teaching, many colleges and universities only pay attention to the teaching work itself, but ignore stimulating students' innovative thinking, can not give full play to their subjective learning initiative, and the concept and practice system of developing students' innovative thinking has not been realized in teaching.

(4) The setting of class content is not reasonable

For the curriculum that practice is more important than theory, due to the restrictions of all aspects of funds, teaching arrangements, laboratories and other conditions, the unreasonable time of curriculum arrangement often occurs. Strengthening the platform for time arrangement and students' personal practice can better improve the relevant professional abilities of students.

2.4. Resistance of Innovative Practical Curriculum Reform

(1) Students are dependent on the traditional teaching model

Configuration monitoring technology is an important professional basic course to cultivate students' ability of computer-aided experiment. Compared with other courses, it has the characteristics of flexibility, innovation and paying attention to practice. This course helps college students cultivate the ability to solve problems and solve problems efficiently. It is of great significance to lay a good foundation for application. At present, many college students have insufficient cultural foundation, no practical experience and professional background, so they have difficulties in employment. It can be seen that the curriculum reform of configuration monitoring technology is imminent. We should consider strengthening practical application according to the scientific research conditions of the school and the actual level of students, introduce the innovative design curriculum teaching of comprehensive practice of configuration monitoring system, change the traditional teaching mode of only according to books without pursuing practice, and improve students' innovative thinking ability and practical ability.

(2) Students' ability to analyze, solve and be flexible needs to be strengthened

Under the traditional teaching mode, students' thinking has basically formed a set. If they join computer assistance at one time, it may be difficult to integrate in a short time. However, under the

innovation and reform, students' learning process will focus on specific tasks and combine tasks with teaching content. In the process of practice, improve their thinking ability and practical ability, and internalize knowledge in the heart at the same time. It is a new, comprehensive, innovative and practical teaching method.

Especially in the era of "integration of two modernizations", the requirements for equipment management and control in industrial field production are greatly improved. At the same time, the new factory production mode integrating the new generation of Internet of things technology and big data technology by using the powerful function of embedded equipment is growing day by day. The research and development of industrial monitoring configuration software occupy a more and more important position. Students master technology as soon as possible, which is of far-reaching significance for learning and future work.

(3) The new curriculum reform has not been deeply understood

The task design of configuration monitoring technology innovation design course needs to pay attention to the following points: first, pay attention to comprehensiveness, combine new knowledge with old knowledge, consolidate existing knowledge while learning new knowledge; second, emphasize initiative. Students should maintain curiosity and fear for knowledge, and learn with tasks in order to fully stimulate their learning enthusiasm; Third, pay attention to practicality, the task should be operable and realizable, and avoid false emptiness, which is too abstract and difficult to realize; Fourth, it is innovative and avoids lengthy task requirements, which limits students' thinking and the diffusion of thinking. The fewer the rules and regulations of the task, the greater the degree of innovation of students; Fifth, pay attention to diversity, strive to involve different knowledge points in different tasks and exercise different abilities, so that students can maximize their abilities in the shortest time; Sixth, enhancing attraction and maintaining high enthusiasm and interest are the important source of students' progress. As long as students feel infinite interest in the process of experiment, it is regarded as the success of curriculum innovation; Seventh, pay attention to operability. The arrangement of learning tasks should be achievable within the scope of students' ability. Too high and too difficult tasks will be counterproductive.

3. Teaching Exploration and Practice of Innovative Practical Course Configuration Monitoring Technology

3.1. Theoretical Thinking on the Course Construction of Configuration Monitoring Technology

The teaching of configuration monitoring technology is a comprehensive course in which the teaching content is implemented in the form of computer-aided experiment, combining theory with practice, and striving to cultivate students' independent innovation ability, practical ability and adaptability. The subject takes the basic use of various software as the teaching implementation carrier, which is easy to understand and progressive in turn. When students learn new knowledge, they review the old knowledge and consolidate it in combination with relevant technologies.

3.2. Key Points of Teaching Innovation of Configuration Monitoring Technology

(1) Investigate the vocational ability needs of relevant jobs of the course, clarify the training objectives and optimize the teaching content of the course. On the premise of maintaining independence, establish long-term cooperation and exchanges with relevant enterprises and industry experts, jointly responsible for the upgrading of teaching modules and formulating detailed and

efficient talent training objectives.

(2) Efforts should be made to cultivate students' independent learning ability. Independent learning ability is a very important and scarce ability in contemporary times. All links of innovative curriculum teaching require efforts to cultivate students' independent learning ability and change the previous teaching method with teachers as the main body. In the process of teaching, teachers should properly guide students to divergent thinking, deeply study problems and make them occupy a leading position. Autonomous learning ability is particularly important for learning configuration software. In the process of answering questions and solving doubts for yourself, you will also get the essential improvement of technology.

(3) We should pay attention to the process management evaluation system. Teachers should regularly check the progress of students, summarize and timely feed back questions every Monday, which is conducive to the next step of students and form a benign learning atmosphere of mutual competition and mutual consultation among students.

(4) Compared with the traditional software, the main role of the teacher is to encourage the students to play in the process of teaching and summarizing; The main roles of students are thinkers and producers, and teachers mainly play mentors and summarists; The main roles of students are commentators and reflectors, and teachers mainly act as coordinators [6]. These stages run through the whole process of teaching design, which can greatly improve the efficiency of teaching experiment. It is a very feasible new innovative teaching course.

(5) Online and offline teaching parallel teaching mode. Classroom training can enable students to put their theoretical knowledge into practice and deepen their impression, while online teaching can further improve students' mastery of professional knowledge. Especially in the post epidemic era, online education has become a normal measure in the state of epidemic prevention. The further integration of curriculum teaching and advanced information technology is an inevitable trend of development. Especially for the course "configuration monitoring technology", which relies on configuration software as the main learning object, the massive information contained can not be separated from the Internet. The development of online education is icing on the cake for this course. Therefore, for online education, colleges and universities can set up a special team for the integration of professional knowledge of configuration monitoring technology and modern information technology to deeply develop efficient and scientific online education resources and put them on network education related platforms, such as Moke, supernova, nail, etc. Curriculum designers should pay attention to the mutual connection and opening of existing online and offline resources, improve the national public education system, strengthen the allocation of information-based teaching equipment, actively introduce relevant information technology talents, and increase the frequency of online academic exchanges at home and abroad [7].

3.3. Exploration Strategy for the Teaching of Configuration Monitoring Technology Based on the Concept of Innovation and Entrepreneurship

(1) It is suggested that students should be divided into groups to jointly complete the whole process of "understanding design requirements - formulating design scheme - Implementing Scheme - writing delivery materials". During the course of the project, students can not only discuss in groups, but also compare, communicate and cooperate between groups. This course encourages students to use more multimedia equipment in class to show their team's design ideas and achievements.

(2) The theoretical knowledge teaching and practice of the course are carried out in parallel, and

the practical training in class is carried out. Configuration monitoring technology is a practical course on industrial control. In the process of industrial production, the management and control of equipment is a necessary professional ability for front-line workers, and these sensors, controllers and intelligent terminals related to equipment management and control are inseparable from configuration software. Therefore, it is very important to carry out practical training for the teaching content of configuration software, It can improve students' understanding of knowledge and provide experience basis for future work in front-line posts. Corresponding training contents can be designed according to the teaching course contents, such as the following examples table 2 [5]:

Table 2: corresponding training can be designed for teaching course content

Course knowledge points	Training objectives and contents
Understanding and basic use of industrial control configuration software	The first stage: under the guidance of the teacher, install the Kingview system program and device program driver, and preliminarily explore and understand its design and operation principle. The second stage: be able to preliminarily use Kingview software to establish basic operations such as engineering, design picture, define variables, animation design of configuration picture and so on.
Command language programming	Be able to master the type of command language and the basic use of command language functions; The training content can be to design a water lamp with switch control and adjustable delay.
Alarm and event system	Learn the use of alarms and events in Kingview, and be able to design a voice alarm project, buzzer alarm project, etc.
Report system and calendar control	Be able to use the report, use the report historical data to query the function historical data, and use the calendar control of the computer system to realize the daily report, etc.
Engineering application example of configuration software	Analyze and study the lighting system and water supply system of a site, and design a factory batching monitoring system.

(3) Arrange the task of preview in advance and writing technical documents after class to cultivate the awareness of autonomous learning. When arranging the relevant contents of the next class, teachers should improve and supplement the tasks according to the teaching contents, the needs of practical operation and the current industry needs and skills, and should not be completely divorced from reality and society. Students can complete the task of finding materials through books, Internet and other ways, and preview the next course in advance. After the end of the project, students should write technical documents according to the actual operation process, so that students can cultivate correct working ideas and methods while practicing the complete workflow, and improve students' ability to work independently.

3.4. Practical Effect of the Course

(1) Based on the new teaching method of combining learning with doing, students have realized the successful transformation of learning in the practice of "spontaneous learning". Based on the educational principle behind this course, taking the course homework as the main line, it runs through the whole teaching stage of the course completely and orderly, so that the students' systematic thinking can be trained as a whole and their practical ability can be improved. Through the project design, the whole curriculum system is organically combined with learning and doing, so as to have a deeper and thorough understanding of the key points of the curriculum, and improve students' learning interest and enthusiasm [8].

(2) Carry out innovative engineering practice activities inside and outside class to exercise students' innovative ability. Teachers actively guide students to combine theory with practice and

carry out active innovative design practice. Improve students' engineering practice and innovation ability through innovative engineering practice activities inside and outside class [9].

(3) The teaching practice of configuration monitoring technology is completed in the training room. In the whole experimental process, students must strictly abide by the practical procedures and steps, and pay more attention to the process and results, which can improve students' sense of urgency and sense of responsibility, and cultivate and establish a strict work style.

(4) The assessment of the comprehensive results of the course no longer only depends on the final assessment. Students' participation in the training process, task completion degree, task completion quality, attendance rate and relevant technical certificates obtained during the course can stimulate students' learning enthusiasm and always maintain a positive and enterprising learning attitude during the course [10].

4. Conclusion

As a practical technical course, after analyzing the problems that the current curriculum practice design can not keep up with the development of policy industry, the lack of effective communication and exchange with the industry, the lack of innovation and entrepreneurship awareness of teachers, and the unreasonable setting of class content, the teaching reform should meet the technical needs of current vocational posts, cultivate students' autonomous learning ability, establish a management evaluation system Starting from the innovative points of the importance exchange of roles between teachers and students and the parallel teaching of online and offline, we have constructed a new talent training mode of parallel theoretical knowledge and practical training, which helps to cultivate professional and technical talents, promote students to correct their learning attitude and cultivate the awareness of independent innovative learning. At the same time, we hope to provide reference for the innovative teaching reform of other courses.

Acknowledgements

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