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Teaching Reform and Research of "Microcontroller Application Technology" Course Based on " Ideology and Politics leading and practice running through"

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Abstract: Combining the fundamental task of national moral education and the characteristics of modern vocational education for students, the teaching mode of "Ideology and Politics leading and practice running through" is proposed, taking the course "Microcontroller Application Technology" as an example. Through the analysis of teaching in the past year, students' awareness of socialist core values, patriotism, humanistic qualities and behavioral norms have been significantly improved; the classroom atmosphere is active and the two-tier division has been significantly reduced; and the skills development ability and dual creativity level have been significantly improved.

Keywords: Ideology and Politics; Project Practice; Practical Education; Microcontroller Technology.

1. Introduction

With the deepening of the concept of Made in China 2025, the digitalisation and intelligence of manufacturing equipment has become a trend, and microcontroller technology is a necessary way and an important grip to achieve this goal. Therefore, it is of great significance to carry out research on the teaching reform of "Microcontroller Application Technology" and to cultivate skilled talents with both moral and talent in microcontroller technology in the new era.

Under the leadership of the core idea of "building moral character" put forward by General Secretary Xi Jinping, "Curriculum Civics" has become an important direction of the current curriculum reform research in colleges and universities [1-3]. However, at present, there is little literature on the teaching reform and practice of "curriculum thinking and government" related to microcontroller courses, and the research objects are mainly focused on the construction of professional macro team and theoretical basic course settings [4-9]. Therefore, it is a pioneering and innovative study to carry out the reform of the teaching reform of the course "Civics and Politics of Microcontroller Application Technology".

This paper combines the characteristics of higher vocational students' love for practice and operation, combines the course philosophy and practice, proposes a new teaching reform model of the course "Microcontroller Application Technology", takes the project practice as the basis, introduces the philosophy and education The new model of teaching reform for the course "Microcontroller Application Technology" is based on the project practice, introducing the carriers and elements of ideological and political education, unifying "knowledge transfer" and "value leadership" in a "silent" way, and realizing the relationship between "learning technology, cultivating The aim of the teaching is to "learn skills, develop qualities and shape values".

2. Course Objectives

2.1. Overall objective

In order to implement the mission of establishing moral education, combine the school's orientation of "deeply integrating with the regional industry chain and innovation chain", target the talent demand of "intelligent electrical industry" in Wenzhou region, according to the national requirements for training talents in automation, "1+X" vocational skills standard and the curriculum standard of this major, according to the background and real needs of the times, through "red and specialized" project practice, to achieve the teaching goal of "learning technology, cultivating quality and tracing value" in one

2.2. Knowledge objectives and competence objectives

Through the practical teaching mode of "learning by doing, studying by learning, creating by studying", students will master the knowledge and skills of microcontroller I/O port input and output, interrupt system, timer, serial communication, A/D acquisition, etc., and develop the ability of engineering application research and development, debugging and error correction, and resource analysis and searching.

2.3. Ideological and political objectives

The course is planned in a way that is both practice-oriented and practice-infiltrated, to enhance students' moral sentiments, behavioural qualities and spiritual culture, and to practise core socialist values.

The main line of thinking and politics is planned for the whole semester, and through the "goal-oriented" embedding of thinking and politics elements, the spiritual quality, code of conduct and value beliefs of "three loves, two strictnesses and one belief" are cultivated, so that the spiritual quality of love for the Party, love for the people and love for the environment is continuously enhanced; the strict discipline and The students will also be able to consolidate the style of rigorous

and meticulous behaviour and strengthen their national pride in science and technology.

The design of classroom teaching and learning is complemented by the "process of infiltration", which is a way to cultivate the qualities of standard operation, courageous exploration, good practice, willingness to share, teamwork, and love of work.

3. Teaching System

Based on the principle of "keeping up with the times, keeping up with students", and in accordance with national policies, news hotspots and campus life, we have explored such educational vehicles as "A Gift to the Party", "Civilized Dormitory" and "China's 'Core'". "The programme is based on the principles of national policies, hot news and campus life. Designing a teaching system in which the main line of thinking and politics and the auxiliary line of teaching are "two-pronged" and carrying out practical teaching projects

3.1. Ideological and political mainline

The entire semester of the course is planned through a "three-guided" model of goal orientation, process orientation and evaluation orientation.

The goal-oriented approach is directly embedded in the thinking and politics element. Through "practical and specialised" project examples, the background and objectives are described directly in the project introduction, and the elements of the philosophy are made clear. For example, in a civilised dormitory, the project "Making a timed reminder device" is designed from the point of view of punctuality and discipline.

Process-oriented integration of the whole course of study into the ideology. The whole process of the project is based on the Huawei Programming Code and the Chint Electrical Code, which are used as guidelines for the design of the programme and the actual production. The spiritual culture of Huawei as a national enterprise and the engineering culture of Astronergy as a local industry are integrated throughout the course. At the same time, students are encouraged to set ambitious goals and plan their university life early.

Evaluation orientation permeates Civics in all aspects. The design of pre-course, in-course and post-course Civics evaluation and grading mechanisms include pre-course grading of students' perceptions of life (Civics), in-course evaluation of teachers' and students' interactive behavioral Civics, and post-course grading of students' and students' interactive filming of Civics micro-video. Teachers and students will build a platform for the Civics case bank and grade directly on the platform to increase student participation and motivation.

3.2. Ideological and political subline

During the lesson, teachers draw out the carrier of education according to the class content and students' performance in the lesson, interactive communication and individuality in solving the problems, teach according to the material, dynamically integrate the elements of thinking and politics, and enrich the content of teaching thinking and politics. After the lesson, through the senior mentors and enterprise mentors, the special students are led to carry out skills enhancement and comprehensive practice, model leadership and expand the thinking and politics.

4. Implementation Methods

The main sources of thinking and education elements are practice objectives, assessment criteria and the teaching process. The ideological objectives are directly embedded in the practical objectives, the ideological elements are indirectly integrated in the evaluation criteria and the ideological points are dynamically infiltrated in the teaching process.

4.1. Implementing a practical teaching model that integrates learning, research and creativity, and directly embeds ideological objectives

Table 1. Practical teaching arrangements for the whole semester project of the course

Project name	Practice content	Methods of integration	Ideology and Politics element
Project 1: Five Star Red Flag Light Making	Learn I/O port configuration, master LED light control and light up the five-star red flag.	The centenary of the founding of the party, a gift to the party, design a five-star red flag lamp.	Love for the Party and the Country Science and technology for the nation
Project 2: Making a sitting reminder table lamp	Learn the interrupt system and master external interrupt control to enable interrupt alerts when sitting distance is close.	Maintaining a healthy sitting posture in class and good habits need to be developed from an early age.	Human Care Focus on Health
Project 3: Making a reminder device to turn off lights on time	Learn about timers and master timer control techniques to achieve timed reminders.	The introduction of a five-star bedroom student routine promotes the need for lights out and bedtime on time.	Be strict with yourself Discipline yourself on time
Project 4: Production of a voice recognition control device for waste separation	Learn serial communication, master the communication technology of iflytek voice recognition chip and realize language recognition open cover control.	Observe the video of the high-tech waste separation device to introduce the importance of waste separation.	Environmental Awareness Beautiful China
Project 5: Epidemic temperature monitor production	Learn A/D acquisition and master temperature sensor measurement for temperature monitoring.	The high demand for temperature measurement during epidemics leads to accurate temperature measurement and safety.	Rigorous and precise Safety and security
Project 6: Beidou positioning technology product design and production	Integrated application of microcontroller technology, embedded BeiDou module, to obtain positioning information and realize the design of technological works.	Break the foreign chip blockade with China's 'core' and boost national confidence.	Technology Confidence National Pride

Based on the project practice, the teaching mode of "learning by doing, researching by learning, and creating by

researching" is carried out. Through the introduction of the industry background and target outcomes, the project learning embeds the objectives of thinking and politics and clarifies the key points of thinking and politics. The teaching arrangements and the main elements of the project practice for the whole semester of the course are shown in Table 1

4.2. Constructing a ternary thinking and political evaluation system and indirectly integrating thinking and political elements

The three-tier evaluation mechanism of "teacher-led assessment, student mutual assessment and class assessment" is implemented. The teachers' main assessment of classroom behaviour cultivates the behavioural habits of students who are disciplined, proactive and meticulous; the students' mutual assessment of team contribution cultivates the moral qualities of mutual help, dedication and sharing; the class common assessment of the value of the work enhances the spiritual values of expanding thinking, innovation consciousness and technological self-confidence.

4.3. Thinking seminar on the elements of nurturing together, dynamic infiltration of the key points of thinking

Professional teachers conduct weekly brainstorming sessions to summarise common classroom teaching scenarios, analyse the characteristics of professional knowledge, and refine the elements and methods of integration of thinking and politics through the Civics Seminar Workshop.

5. Conclusion

This paper takes the course "Microcontroller Application Technology" as an example, discusses the significance of the course Civic Politics in the reform of the course, combines the characteristics of students to propose a teaching mode that combines with practice, takes the project practice objectives as the carrier, embeds Civic Politics objectives; takes the project practice process as the basis, runs through the Civic Politics main points; takes the evaluation of practice results as the guide, integrates Civic Politics elements. The daily teaching focuses on the cultivation of students' habits and value leadership, and carries out teamwork, group mutual assistance and individual guidance modes according to the students' aptitude. The "moral education element" is integrated into the course teaching through hot news, stories and cases, teaching situations, classroom discussions, innovative practices and evaluation of works. This teaching model has been implemented for one year. Analysis of the results shows that students' knowledge of socialist core values, patriotism, humanistic qualities and behavioural norms have been significantly improved; the classroom teaching atmosphere is active and the polarisation between two levels has been significantly reduced; the skills development ability and the level of dual creativity have been significantly improved.

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