ISSN: 2637-6067 DOI: 10.6918/IJOSSER.201912_2(10).0008

Teaching Reform of CNC Technology Course Under the Ideological and Political Education

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Abstract

Computer Numerical Control (CNC) technology is a key professional course for the students of major of machinery. The content of the course is in line with the spirit of Chinese manufacturing and the spirit of great craftsmen. Through curriculum reform, the teaching design and teaching methods can be improved. In professional teaching, the elements of the ideological and political education are connected with each other. With the support of the ideological and political elements, and through the strengthening of practical teaching and training links, it will provide positive guidance for the cultivation of students' artisan spirit thus laying a solid foundation for students' innovation and entrepreneurship.

Keywords

Ideological and political education; CNC technology; teaching reform.

1. Introduction

After the National Ideological and Political Work Conference, especially after the National Education Conference and the Undergraduate Education Work Conference in china, we are thinking about how to do a good job in the Ideological and political education for the major courses [1]. In the non-Ideological and Political course, we have joined the ideological and political elements to carry out curriculum reform. All colleges and universities are exploring this reform method, and strengthening moral education into the whole teaching process in an all-round way, thus promoting the traditional ideological and political courses and the major courses with ideological and political elements to work together and complement each other to build a large-scale education system. It is one of the important tasks facing Chinese universities in the new era.

In recent years, classroom teaching reforms are in the ascendant, and new teaching modes such as MOOC, micro-class, and flip classroom are emerging one after another [2]. However, the essence of the classroom is still the emotional communication, thinking collision and knowledge between teachers and students. The goal of training the trinity of value shaping, capacity building, and knowledge transfer is indispensable. In order to cultivate talents with both ability and political integrity, teachers must put the students' ideological and moral education at the forefront of the professional courses, and throughout the course. Teaching and educating people should be all-round. In addition to imparting professional knowledge, special attention should be paid to cultivating students' sense of responsibility and mission. Therefore, teaching and educating people should be comprehensive. Teachers must not only impart professional knowledge, but also pay special attention to cultivating students' sense of responsibility and mission.

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2. The Inner Connection Between the Teaching of CNC Technology Course and the Cultivation of Artisan Spirit

The CNC technology course is a key professional course for mechanical students. It is a professional theory course based on mechanical processing technology and closely related to production practice. The main contents of this course include the overview of CNC machine tools, the mechanical structure of CNC machine tools, the basis of CNC machining process, the preparation of CNC machining programs, computer numerical control devices, and servo systems of CNC machine tool. CNC machine tools and other CNC equipment are the main production equipment for modern machinery manufacturing [3]. The CNC machining process will be a technology that must be mastered by technicians engaged in manufacturing in the new century.

In the teaching of numerical control technology courses, based on ensuring the basic teaching content, the connotation and development requirements of Chinese manufacturing and artisan spirit should be fully explored. At present, China's manufacturing industry still has problems such as large but not strong, low overall product quality, and weak independent innovation capability [4]. It is necessary to nurture and promote the spirit of craftsmen from the big manufacturing country to the manufacturing power, from Chinese manufacturing to Chinese intellectual creation [5]. Ideological and political education can effectively convey a scientific spirit, and through the combination of specific professional curriculum content, to cultivate students' spirit of seeking truth from facts. The essence of the processing spirit is a craftsman spirit that has been painstakingly studied. Colleges and universities are positions for cultivating advanced manufacturing technology talents. By adding the ideological and political elements of the CNC technology course, students not only mastered the CNC machining technology, but also shaped their patriotism.

3. Teaching Methods and Means of CNC Technology Course Based on Ideological Elements

Professional curriculum teachers should have a correct political stance and a firm political awareness, fulfill the initial position of teaching and educating people, and take the initiative to undertake the task of cultivating socialist builders and successors. Obviously, how to cultivate the CNC technical talents with the craftsman spirit in the new era is a major mission of college teachers.

3.1. The Ideological and Political Content of CNC Technology Course

The course of ideological and political education is not a simple "course" plus "ideological and political education", nor is it to teach the content of politics by few class hours in the professional curriculum. The relationship between "Ideological and political education" and "Course" should avoid the tendency of the content of moral education to be wedged into professional courses. The two should not be mechanical combinations but should be organically integrated, mutually promoted and coordinated.

The professional curriculum contains a wealth of ideological and political elements. On the one hand, the knowledge of CNC technology itself has obvious value tendency and feelings of home and country; on the other hand, teachers can further expand and develop on the basis of existing ideological and political elements through in-depth mining. Professional teachers can work hard in three directions as follows. First, review the basic ideas of Marxist philosophy and its application methods, and master the tools of human thinking. Second, learn the main spirit of the ruling party and master the basic policy basis for the next five years. Third, in combination

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with the direction of the mechanical profession, appropriately study the Chinese economics, politics, culture, zoology and related theory of party.

3.2. Combing the Course Knowledge Points and Integrate into the Ideological Elements

With the elements of ideological and political education, how to integrate these elements into professional teaching? The ideological and political education of professional curriculum should adopt a way of learning, while understanding and practicing, so that many ideological and political elements contained in the course knowledge points can be developed and presented in various ways in the classroom teaching process.

First, teachers teach and students learn. In addition to the teaching design, sign-in name, professional lectures, rules and explanations, teacher questions, assignments, commentary assignments, unit summaries, etc., which are inherent in the normal teaching process, each teacher can also teach and pass on some inspirational thoughts and stories to the students. For example, the relationship between CNC technology and the rule of law, the development of numerical control machine tools and the development of things, the improvement of professional competence and the practice knowledge.

Second, through group discussion, enhance students' sense of teamwork. In the classroom teaching, students can be grouped to complete a task in a group discussion. It is not difficult to see that group discussion and learning also contain elements of ideological and educational education. For example, the two groups with good performance and poor performance are used to analyze their achievements, and the following conclusions are drawn: As a college student, everyone should have team awareness and responsibility awareness. It is the responsibility to complete the work for every member. Everyone needs to have the role and responsibility, otherwise the assigned learning tasks will not be easy to complete.

Third, practical teaching is an effective way to convey the elements of ideological and political education. In practice links such as post-training, industrial apprenticeship, and course design, it covers ideology elements such as punctuality awareness, division of labor awareness, responsibility awareness, normative awareness, team awareness and integrity awareness et al. it is supposed that students are required to complete a certain CNC machining task within a certain period of time. During the completion of the task, the students are immersed in the experience of division, punctuality, responsibility, standardization and teamwork, which is very important in the future work. At the same time, the practical teaching link not only enables students to better understand the ideological and political education, but also personally practiced the ideological and political education.

4. Case Analysis

The teaching of CNC technology should be closely related to the manufacture of Chinese machinery and the basic knowledge of mechanical cutting, detailing the proportion of the mechanical processing industry in the national GDP, and cultivating students to love the mechanical profession and life [6,7]. The value of cutting three elements directly reflects the craftsmanship spirit of excellence. In the teaching of CNC machining process, the teaching of the dimension chain not only cultivates students' ability to read chartings, but also cultivates the meticulous craftsmanship of students.

The NC machining process specification further enhances the students' ability to read pictures through the teaching of the process dimension chain, cultivates the meticulous craftsmanship of the students; explains the selection of the positioning benchmarks with specific parts and trains the students; and allows the students to determine the machining allowance and process size. Understand the progressive relationship of the process; through the operation of the

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universal fixture of the CNC lathe, to cultivate students who love the profession and serious focus on the craftsmanship. Seamlessly integrate the ideological content with the theoretical content of the course. Through the specific parts to explain the choice of positioning benchmarks and train students, determine the processing allowance and process size, let students know that the process has a rigorous progressive relationship, and then cultivate students to love the profession and serious focus on craftsmanship. Obviously, the seamless connection between the ideological content and the theoretical content of the course can be basically achieved.

Case 1: China's 70th National Day military parade sparked an unprecedented patriotic craze. By introducing this event in the classroom, students' patriotism can be stimulated and students' love for mechanical profession can be promoted. In the military parade, the Dongfeng-41 missile and the J-20 were military machinery, but these were mechanical equipment from the concept of machinery. Therefore, in the teaching of CNC technology courses, after introducing this proud military equipment, discussing with students and learning together will have a good patriotic education effect, and promote the students' determination and interest to further study mechanical majors.

Case 2: Through the shaft part shown in Fig.1 and end cap part shown in Fig.2, it can be seen that the dimensions of the shaft and the end cap have strict requirements. Therefore, the CNC machine tool must compile the processing technology and programming according to the drawing size requirements when processing the shaft and the end cap parts. Obviously, students must have a rigorous working attitude when processing parts. Once careless, the parts are likely to be scrapped. In addition, in the process of processing, the workshop environment is generally dirty, and the parts are relatively heavy, which requires the processing technician to have the spirit of hard work. Therefore, through the implementation of this link, not only to tell students about the knowledge of CNC machining parts, but also to instill students not afraid of suffering, not afraid of tired, to cultivate students meticulous, serious focus, the pursuit of excellence in craftsmanship.

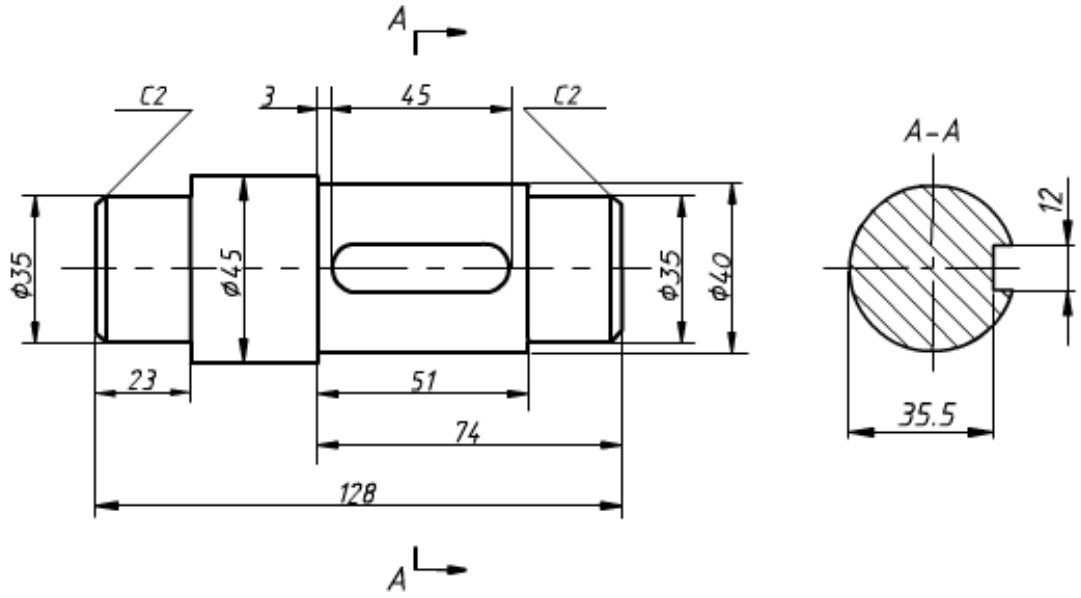

Fig 1. Machining drawing of shaft part

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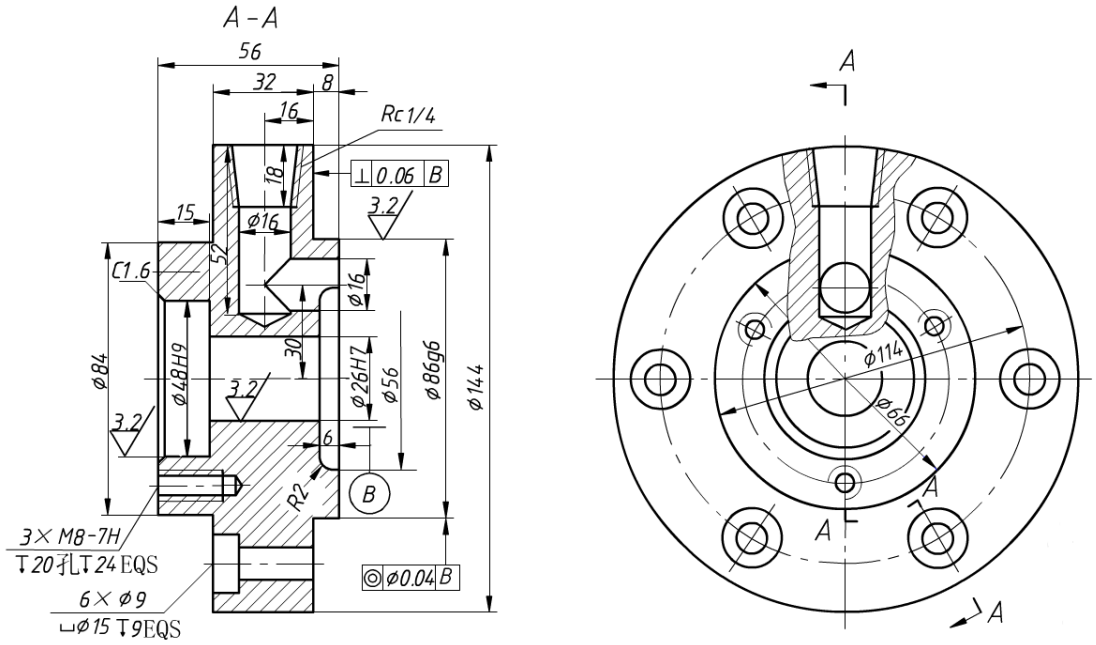

Fig 2. Machining drawing of end cap parts

5. Summary

Major is the basic unit of talent training at university, and the curriculum is the fundamental foothold of talent cultivation. Ningde Normal University implements the fundamental tasks of ideological and political education, deepens the reform of education and teaching, and strives to use the main channels of classroom teaching under the pattern of “all-people education, whole-course education and all-round education”, and highlights the educational characteristics including "national consciousness, humanistic feelings, scientific spirit and professionalism", realize the organic unity of value guidance, knowledge transfer and ability training, stimulate students' enthusiasm and motivation for learning, and help them to define their own values and social values in study.

Acknowledgments

This work is supported by the college students' innovation and entrepreneurship projects in Fujian Province (Grant No. 201910398059), the Special Project of Ningde Normal University in 2018 (Grant No. 2018ZX409, Grant No.2018ZX401) and Research project for Yong, Middle-aged Teacher in Fujian Province (Grant No. JT180601 and Grant No. JT180597). These supports are gratefully acknowledged.

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ISSN: 2637-6067 DOI: 10.6918/IJOSSER.201912_2(10).0008

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