The Ideological and Political Teaching Practice of the Course "Mechanical Manufacturing Technology Fundamentals" Under the Background of "New Engineering"

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Abstract. To optimize the teaching content, it relies on the "New Engineering" project to revise the curriculum syllabus, and integrate the ideological and political elements such as craftsmanship, innovation, and May Fourth spirit into the course teaching of "Basic Mechanical Manufacturing Technology" through actual cases; in order to finish the fundamental task of fostering virtue through education, training students establish correct outlook on life and values, and deliver compound talents that meet social needs.

1. Introduction

At the National Conference on Ideological and Political Work in Colleges and Universities, General Secretary Xi Jinping emphasized that we must make good use of the main channel of classroom teaching, and all courses must go in the same direction with ideological and political theory courses to form a synergistic effect. The integration of ideological and political education into professional curriculum education is of great significance to the cultivation of students' ideological values and the improvement of comprehensive quality.

2. Teaching Purpose of "Basic Mechanical Manufacturing Technology"

"Machinery Manufacturing Technology Fundamentals" is one of the important core courses of mechanical manufacturing and related majors. It is a comprehensive technical discipline that studies the process and equipment issues in the processing of mechanical parts. It has the characteristics of taking practice and applying it to practice. In the course of course construction, it is necessary to uphold the teaching concept of "fostering virtue through education", organically unify professional knowledge and curriculum ideological and political elements, and subtly integrate the curriculum ideological and political elements in professional lectures to stimulate students' sense of responsibility and patriotism. It has played a leading role in establishing a correct outlook on life and values for students[1-3]. Based on the background of the "new engineering" reform, it is necessary to actively adapt to the new mode of multi-party collaborative education of new engineering, and to transform the traditional engineering to the new engineering education philosophy[2].

3. Ideological and Political Case Design for the Course "Basic Mechanical Manufacturing Technology"

In the basic classroom teaching of machinery manufacturing technology, according to the teaching content, appropriately introduce ideological and political cases into the classroom, optimize the
teaching content, and improve the quality of teaching. The design of the ideological and political case of the course of mechanical system technology basis is shown in Table 1.

Table 1. Ideological and political case design for basic course of mechanical system technology.

<table>
<thead>
<tr>
<th>Teaching content</th>
<th>Entry point of ideological and political elements</th>
<th>Education Goals</th>
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</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>Looking back on the development history of my country's manufacturing industry, from self-reliance, starting from scratch, to a manufacturing powerhouse.</td>
<td>Analyze the deep-seated reasons for the gap, stimulate the patriotic enthusiasm of young students, and establish the belief in fighting for the great rejuvenation of the Chinese nation.</td>
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<tr>
<td>(1) The development history of the manufacturing industry</td>
<td>Looking back at the older generation of scientists who have dedicated their lives to the construction of the motherland. Analyze my country's current national strength and national defense.</td>
<td>Cultivate students' lofty ideals. Establish the common ideal of socialism with Chinese characteristics and realize the unity of personal and social values. Establish students' &quot;four self-confidence&quot;.</td>
</tr>
<tr>
<td>Manual → Machinery → Mechanical Manufacturing Technology → Machining Technology → Machine Tool Manufacturing Certain Machinery → Manufacturing Technology (including non-mechanical processing methods) → Advanced Manufacturing Technology</td>
<td>&quot;In the summer of 1953, the three-point seven-blade twist drill invented by the young fitter Ni Zhifu has an important position in the industry. Ni Zhifu embodies the &quot;craftsman spirit&quot;.&quot; In the &quot;knife sharpening&quot; class of the course, the &quot;Ni Zhifu drill bit&quot; was introduced. The story makes students feel the power of patriotism and &quot;craftsman spirit&quot;.</td>
<td>Explain from the basics of the processing, consolidate the basic knowledge, and keep in mind that &quot;the foundation is not strong, the earth will shakes &quot;. Adhering to the &quot;craftsman spirit&quot; can we create the best quality products in the industry and be successful in the long-term competition.</td>
</tr>
<tr>
<td>Chapter 1 Basic Knowledge of Metal Cutting Process</td>
<td>Realize the &quot;craftsman&quot; spirit of a major country, accelerate the research and development of high-end CNC machine tools and basic manufacturing equipment, and illustrate the importance of basic parts from the perspective of the relationship between the overall performance of the machine tool and the performance of key basic parts.</td>
<td>Point out the necessity of building my country's &quot;four bases&quot;: basic materials, basic parts (components), basic technology and industrial technology foundation).</td>
</tr>
<tr>
<td>Chapter 3 Metal Cutting Machine Tool</td>
<td>In teaching the selection of positioning components, the application of positioning components such as diamond pins fully reflects the wisdom of engineering and technical personnel. In the teaching of positioning error, it is fully explained that the scientific nature of engineering calculation is very important, otherwise the seemingly reasonable positioning scheme will fall short.</td>
<td>Learn from the majority of engineering and technical personnel, and cultivate the craftsman spirit of students who are good at studying and not afraid of difficulties. In engineering cases, cultivate students' scientific exploration spirit of excellence and improve students' engineering awareness.</td>
</tr>
</tbody>
</table>
When discussing the choice of mechanical processing methods, it is mentioned that the processing precision that can be achieved by human beings is getting higher and higher. My country has been following in the footsteps of special processing and precision processing, but we are not far behind and are catching up in all aspects.

Cultivate students' ability to understand problems dialectically. Through the analysis of the deep-seated reasons for the gap in processing in our country, the students will be inspired to work hard and be strong. Cultivate students' national spirit with patriotism as the core.

When analyzing all the factors that affect the machining accuracy, firstly use the single factor analysis method, and then use the statistical analysis method to conduct a comprehensive analysis. It is necessary to find out what causes the machining error, why it occurs, and how to improve the machining accuracy.

Through detailed interpretation of the causes of errors, students are informed that science must not be false and cut corners, and cultivate students' scientific inquiry spirit of seeking truth from facts and insisting on getting to the bottom of the matter.

In the analysis of cutting and grinding processes, in order to reduce the surface roughness, a large amount of cutting fluid will be used, paying attention to the impact on the environment and health; when analyzing the physical and mechanical properties of the metal surface involving heat treatment, in addition to paying attention to the impact on the environment, there should also be safety awareness; when analyzing vibration during machining, pay attention to the impact on health and the environment.

Cultivate students' awareness of environmental protection, health and safety, establish the concept that the earth is our common home for mankind, destroy the environment is an offence, and cultivate the legal awareness of protecting the environment.

4. Teaching Implementation Process

In the introduction, the development and importance of manufacturing technology are described. When discussing the development process of my country's manufacturing technology, it incorporates ideological and political elements at an appropriate time. Use the dedication and dedication of the older generation of scientists to encourage students to carry forward the spirit of the "May Fourth Movement". The core content of the "May Fourth Spirit" is "patriotism, progress, democracy, and science." Patriotism is the source of the May Fourth spirit. As contemporary young college students, they must inherit and carry forward the May Fourth spirit and pass on the May Fourth spirit forever.

"Basic knowledge of the metal cutting process" describes the importance of consolidating basic knowledge, keeping in mind that "the foundation is not strong, the earth will shakes." Establish the lofty ideal of fighting for the great rejuvenation of the Chinese nation, cultivate students' interest in learning, realize the "Chinese Dream" and realize the "Manufacturing Chinese Dream". Through the latest videos and pictures, students are guided to realize the important role and unique role of manufacturing in the national economy. Through the proud achievements made by my country's manufacturing industry since the reform and opening up (such as manned spaceflight, lunar exploration projects, deep-sea projects, etc.) and the dilemma of "stuck neck" technology (ZTE's "broken core" incident, industrial software, etc.), guide Students clarify the opportunities and challenges facing my country's manufacturing industry, and make their own contributions to the take-off of the motherland, so as to train students to resolutely achieve the "two safeguards" and strengthen the "four self-confidence".

In the teaching of "Machine Tool Fixture Design", it is necessary to teach the selection of
positioning components. Many of the delicate structures of positioning components are the result of the hard work of the majority of engineers and technicians. For example, the use of diamond-shaped pins is their whimsical idea. The simple and exquisite structure quickly solves the over-positioning problem of the two-pin positioning on one side of the box body, ensuring the processing accuracy, it can be described as accomplish a great task with little effort by clever maneuvers. "Ni Zhifu drill bit" has an important position in the industry so far. With the exploratory spirit of the majority of engineering and technical personnel, students are encouraged to love their professions, to be proficient in the business of this profession, to strive to become experts in this profession, and to cultivate students' craftsmanship.

When teaching the calculation of positioning error, a typical engineering case is used to fully explain the importance of positioning error calculation in the positioning plan. Even if the positioning plan is determined completely according to the processing requirements of the workpiece, it seems completely reasonable, but because the reference does not overlap, the positioning error is passed. Calculating, the processed products will also have a lot of waste products, and the positioning scheme needs to be improved. Use real engineering cases to let students feel the importance of learning scientific knowledge, pursue the charm of excellence, and cultivate a working attitude that is not afraid of hardships and a spirit of hard research and exploration.

In the teaching of "Machining Process Regulations", when discussing the processing methods of typical surfaces, the current position of our mechanical processing industry is analyzed. Although the level of China's manufacturing industry has been greatly improved since the reform and opening up, the level of my country's manufacturing industry has been greatly improved. Special processing and precision manufacturing technologies are still not at the leading level. For example, because the United States restricts the use of Huawei's lithography machine, it tries to hold our throat and hinder the development of science and technology in our country, thereby motivating students to study hard, to be rich and strong for the motherland, and not to be controlled by others. Study hard to help students realize the long-term, arduous and tortuous nature of their ideals, and cultivate their perseverance and patriotism.

The greatest charm of the formulation of machining process regulations is that there is no uniqueness. Everyone can design different processes. Only by achieving high-quality, high-efficiency and low-cost process principles. Encourage students not to followed the herd simply, to think independently, to demonstrate their skills fully. In the process of compiling process regulations, students are encouraged to explore and cultivate the spirit of the creation.

In the teaching of "Machining Precision", the single factor method is first used to analyze all the original errors of the process system, and various factors need to be fully considered. The reason why the size of the workpiece produces machining errors is not the cause of one of the factors, but is often the result of the combined effects of several factors. Students need to carefully analyze and find out the reasons for the machining errors, and reduce the errors and improve the machining accuracy. Measures. After training, cultivate students' spirit of scientific exploration.

In the teaching of "Machining Surface Quality", in order to ensure the surface processing quality, reduce the surface roughness, cooling and lubrication is one of the most important means. However, if cutting fluid and lubricating fluid are discharged randomly, it will have a great impact on the environment and people's health; therefore, we must cultivate students' environmental and health awareness, protect the environment and protect the earth, which is to protect our common home.

When analyzing the process factors that affect the physical and mechanical properties of the surface metal, it is necessary to talk about a variety of heat treatment methods. The operation process has a certain degree of danger. Training students' safety awareness and sense of responsibility will also involve the impact on the environment and the health of the people. Influence, cultivate students' environmental awareness.

Vibration during processing will not only reduce the accuracy of the workpiece, but also generate greater noise, which will adversely affect the environment and the human body. To explore students who can reduce vibration, cultivate students' environmental awareness, and establish green water and green mountains is the idea of gold and silver mountains.
5. Conclusion

In the ideological and political teaching of the "Mechanical Manufacturing Technology Foundation" course, the "Craftsman Spirit", "May Fourth Spirit" and "Innovative Spirit" are used to improve students' ideological quality and lead them to shape correct outlook on life, values and world outlook. Through the practice of ideological and political teaching to create a young army of machinery manufacturing professionals with excellent professional qualities and ideological morality.

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Reference


