

# *Mining of Ideological and Political Elements and Teaching Design of Ideological and Political Content for Mechanical Drawing Course*

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**Abstract:** Under the background of education in the new era, curriculum ideology and politics has become an important means to convey the core view of socialist values in the college education. How to explore the ideological and political elements in engineering teaching activities and realize the organic combination of ideological and political education and engineering knowledge education is a problem of teachers majored in science and engineering. It is necessary to think deeply in their teaching activities. Therefore, this paper takes Mechanical Drawing, a basic course for science and engineering majors, as an example to dig deeply into the ideological and political elements contained in the course and carry out a teaching design around the chapter of the prescribed drawing of threaded fastener, so as to provide a reference for other science and engineering courses to dig into the ideological and political elements more deeply.

## 1. Introduction

Under the background of the construction of great modern socialist country in the new era and the rapid development of higher education, the promotion of curriculum ideology and politics has become an important way to transmit socialist values, improve the ideological and political education system, and realize the education goal of all-round development of morality, intelligence, physiology<sup>[1]</sup>. Curriculum ideology and politics refers to a comprehensive educational idea which combines various courses with ideological and political theory courses in the form of building a whole-staff, whole-process, and whole-course education pattern, forming a synergistic effect, and taking "cultivating morality and educating people" as the fundamental task of education<sup>[2]</sup>.

## 2. The Importance of Curriculum Ideology and Politics in the Teaching Process of Mechanical Drawing

A country without virtue does not thrive, and a person without virtue does not stand. How to realize the fundamental task of cultivating people with a great virtue? The General Secretary of People's

Republic of China has told us that we should make good use of teaching classroom as the main channel, and all kinds of courses should be in the same direction as ideological and political theory courses to form a synergistic effect. Mechanical Drawing, as a basic required course of professional technology for freshmen, includes the teaching of the projection principle of geometric shapes, the expression regulation of engineering drawings, the drawing method of mechanical parts (standard parts and non-standard parts) and assembly drawings. It fully explains the principle of mechanical drawing, the national standards and the expression of engineering drawings, so that after a semester of learning, students can have the ability to draw engineering drawings, regulatorily, a broad basic professional knowledge. It can lay a good foundation for the future study of mechanical professional courses (such as "Mechanical design", "Mechanical principles", etc.). Therefore, it is very necessary to guide and cultivate contemporary college students who just enter the university to establish a correct outlook on world, life and values by connecting the basic professional course such as the "mechanical drawing" course with curriculum ideological and political education.

### **3. The Mining of Ideological and Political Elements and the Teaching Design of Ideological and Political Content for Mechanical Drawing course**

#### **3.1 The Mining of Ideological and Political Elements**

Mechanical Drawing is a basic professional course that closely combines theory with practice. Therefore, it is necessary to educate students the ideological and political elements by Mechanical Drawing course<sup>[3]</sup>. In order to further explore the ideological and political elements in this course, the teaching content and core knowledge points of each chapter of the textbook of Mechanical Drawing can be sorted out and the ideological and political elements of the course can be explored, such as the patriotism, the responsibility sense and the mission sense. Combined with the background of major project development and scientific and technological achievements, the deeds of scientists or role model and the demand for the life practices and scientific and technological practices which is related to the teaching content can be mined<sup>[4]</sup>. Specific implementation methods and paths are as follows:

(1) Excavation combined with the historical background of socialism with Chinese characteristics. Since the founding of the People's Republic of China, especially after the reform and opening up, the great achievements of the great practice of socialism with Chinese characteristics have attracted worldwide attention, and become the vivid teaching material for the patriotic education such as "four self-confidence" and "two maintenance". In the daily teaching process, we should combine the current results of science, technology and engineering development, dig deeply into the ideological and political patriotic elements of Mechanical Drawing course, analyze the theoretical logic and practical logic contained in the course, and enhance the effect of the teaching classr.

(2) Exploring the professional quality requirements for students in the future work. Professional quality refers to the comprehensive quality that practitioners need to show in the process of employment, and is the internal norms and requirements of occupation, including professional ethics, professional skills, professional behavior and professional awareness. Different disciplines and majors have very different requirements on students' professional quality. Therefore, in the teaching process, combined with professional background and vocational and technical requirements, the curriculum ideological and political education elements in the course are targeted to improve students' career development ability.

#### **3.2 The Teaching Design with Ideological and Political Content**

The teaching design with ideological and political content is not a simple stack of the teaching design of curriculum with the content of ideology and politics<sup>[5]</sup>. It should be a re-recognized and

reconstructed process on the basis of exploring the ideological and political elements contained in the curriculum, so as to realize the effective combination of ideological and political education and knowledge system of the course education, and achieve the goal of educating people becoming talents in respective position<sup>[6]</sup>. The implementation mind of curriculum ideological and political elements mining and teaching design is shown in Figure 1. Specific implementation methods and paths are as follows:

(1) Theoretical teaching method. Combined with the cases of the frontier academic and engineering practice, the sense of responsibility, mission and great power craftsman spirit of students are integrated into theoretical teaching, and the spirit of responsibility and excellence is cultivated. Integrated with the status, development and bottlenecks of the domestic mechanical design and the processing field, the awareness of scientific and technological innovation should be enhanced and the academic patriotism to improve the level of science and technology of China should be stimulated. Finally, the students will make their own contributions to the realization of the great rejuvenation of the Chinese nation.

(2) Practical teaching method. Teachers should guide students to establish craftsman spirit consciously. For example, through the actual mapping of the assembly drawing, bearing gear and other precision instrument processing and other practical teaching, the engineering consciousness, standardization consciousness and other professional consciousness should be shaped and the innovation, rigorous, responsible, truth-seeking professional spirit should be transmitted, and a correct outlook on world, life and values should be established.

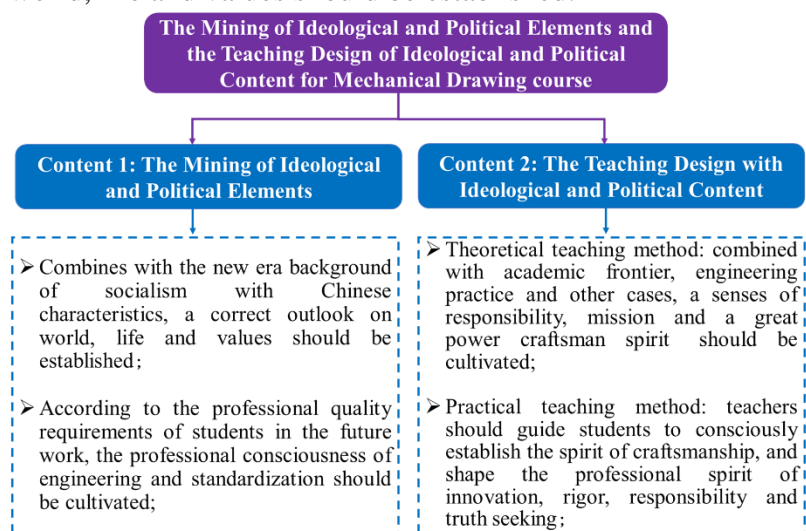


Figure 1: The mind mapping of curriculum ideological and political elements mining and teaching design.

#### 4. A Teaching Case of Mechanical Drawing with Ideological and Political Education

Taking the teaching content of the chapter of the threaded fastener in the prescribed drawing of standard parts and common parts as an example, as shown in Figure 2, the ideological and political elements of the course are introduced into the course teaching process of Mechanical Drawing.

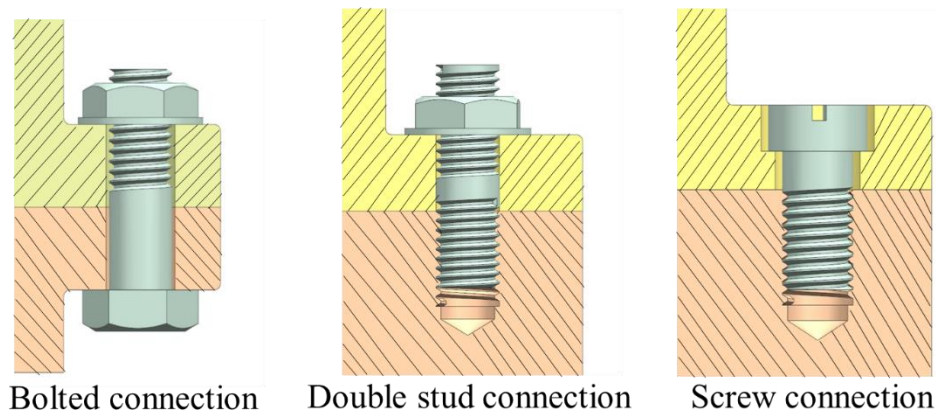


Figure 2: The schematic diagram of three kinds of threaded fastener.

#### 4.1 The Course Content

- (1) The connection form and mark of threaded fasteners;
- (2) The assembly drawing method of bolts, double studs and screws;
- (3) The common errors in bolt connection, stud connection and screw connection.

#### 4.2 Ideological and Political Contents

Case 1: On August 20, 2007, after landing at Naha Airport in Okinawa Prefecture, Japan, Flight Hwa HK120 burst into flames and exploded, putting the lives of 165 people on board in danger. Through data analysis later, it was found that during the pre-maintenance process, the washer in the threaded fastener of the lower stop assembly of the front leading edge of the wing slipped, causing the screw to Pierce the fuel tank, resulting in fuel leakage, and finally the engine fire and explosion. After failure analysis, it was found that the cause of the accident was that in the maintenance process, the maintenance engineer failed to pay attention to the installation of the gasket, and finally caused a disaster. This warns us that in the process of work, we need to have a rigorous and meticulous, serious and responsible, loving and dedicated craftsman spirit.

Case 2: On 10 June 1990, British Airways Flight 5390 suffered a loss of cabin pressure due to a dismantled windshield in the pilot's position. Later, through the analysis of the cause of the accident, it was found that the maintenance engineer of the aircraft before the accident took "as similar as possible" as the criterion, and did not refer to the maintenance files of the aircraft, and installed substandard screws, which led to the accident. After failure analysis, it was found that the cause of the accident was that in the maintenance process, the maintenance engineer chose a non-standard screw, which led to the accident. This is a warning in the process of work with rigorous and meticulous, pragmatic, scientific thinking of professional quality.

#### 4.3 Ideological and Political Elements and Educational Goals

According to an old Chinese saying, a dam of a thousand miles is destroyed in an ant's nest. Through the analysis of these accident cases, it is not difficult to find that many major aerospace accidents are often because a small detail is not paid attention to. This warning applies to other aspects of industrial activity as well. This requires that in our future work, we need to have a rigorous and meticulous work style, a serious and responsible work attitude, a sense of engineering structure design norms and a spirit of excellence.

## 4.4 Teaching Methods

Through teaching method and example method, the connection form, assembly drawing method and common mistakes of threaded fasteners are explained in detail.

## 4.5 Summary of Course

There are no small things in production work. A small screw can be seen everywhere in production and life, and its overall structure or size is not replaced in accordance with the standard during the installation process, which may cause major accidents. Therefore, students pay more attention to the curriculum, introduce ideological and political elements, and refine and reshape the ideological and political value.

## 5. Conclusion

The Mechanical Drawing have experienced a long time to form and develop, and a bright traditional culture has been formed in the process of its development. Combined with the current social development, the ideological and political elements are integrated into the course of Mechanical Drawing, which not only conveys theoretical knowledge to students, but also builds students' patriotic feelings and cultural self-confidence, cultivates students' scientific and professional spirit of materialistic dialectics, enhances the craftsman spirit and sense of responsibility of students, and realizes the teaching of professional knowledge while guiding the world outlook, life outlook and values.

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