

## “Mechanical Drawing” Classroom Teaching Analysis and Reflection

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**Keywords:** Mechanical Drawing, Basic course, Module, CAD.

**Abstract.** "Mechanical drawing" as a mechanical professional very important professional core course, the other courses behind the study has a great impact, more difficult. This article from the students, knowledge modules and teaching aspects of the analysis and reflection.

### Introduction

“Mechanical Drawing” as the basic course of mechanical and related professional, in the freshman opened, divided into two semesters, more than 120 hours, is the first professional contact with students, the difficulty of this course is relatively large, many students learn It is difficult to get up.

### Experience Analysis

“Mechanical Drawing” is different from the high school mathematics, physics and other courses, it is a three-dimensional geometry based on the grasp of the machinery industry-related mapping standards, give full play to the imagination of space courses, mechanical design and processing of the real Parts as research and drawing objects. In the actual teaching, found that most students have different degrees of learning difficulties, summed up the reasons are as follows:

(1) Cannot find a suitable learning method. Because “Mechanical Drawing” is not a complete mathematical logic thinking, and the need for a certain degree of imagination and mechanical parts processing and assembly have a certain understanding as a basis. For students who do not have professional qualifications, the difficulty is not small.

(2) Learning attitude is not correct. Class play mobile phone, sleep more common, so that cannot guarantee the continuity of listening, and “Mechanical Drawing” is a very strong contact before and after the subject, no knowledge of the accumulation in front of the back to learn more difficult.

(3) There is no good combination with the production practice, should arrange the practice of student practice, mechanical processing, such as perceptual knowledge, learn to be able to better imagine the body structure.

### Analysis of Each Module

The basic knowledge and skills of drawing and the basis of orthographic projection is difficult, and most students can master it better, but they should pay attention to the cultivation of learning interest and self-confidence. The "three-dimensional and surface intersection of this module is very difficult, especially the rotary part, drain lines, it is difficult to imagine the body, need to cooperate with the physical model and axonometrics to practice repeatedly, so as to enhance understanding and proficiency. "Axonometrics" theory of knowledge is not difficult, but many students feel unable to start, the reason is the foundation is not solid, the physical picture is not thorough enough, different types of more practice, the links of less talk and more practice, the effect will be good. "The combination of drawing and reading" is a comprehensive application of previous knowledge, rotary body, intersection and intersection line is difficult and error prone points, theoretical knowledge, mapping rules, physical model, complex axonometric drawing, can effectively improve the correctness and accuracy. "The basic representation of mechanical drawing" has a lot of rules, there are some special provisions in the section view, which needs to be understood. "Said the

common parts and structural elements of the law" is a national standard thread, gear and other standard parts and common parts of the painting and check all relevant parameters, this module is very important, should be added to the University, more practice. The understanding and drawing of the part drawing and assembly drawing reading and drawing is the integration of all the modules in the front, which is complex and difficult.

### **The Enlightenment of German Dualistic Vocational Education**

(1)Relative to the school system of vocational education, dual system of vocational education more emphasis on the cultivation of practical skills and make it a guarantee. Which makes the production of the first line of the actual operation of the professional education of professionals to become truly welcomed by the enterprise education. Although our country now attaches great importance to the cultivation of students' practical skills, but the school system of training model objectively so that students away from the production line, and centralized arrangements for production practice is not conducive to students in a timely manner combined with the theory of practice.

(2)Under the dual system of vocational education system, because students in a specific working environment to learn, so that students and businesses have more opportunities for communication, greatly reducing the risk of unemployment after training. This is difficult for my country to solve the problem of hiring for some years have some reference.

(3)Compared with the teaching content of vocational education taught in our country's current emphasis on the theory of vocational education, the dualism vocational education with the job requirements as the training goal is more popular with the enterprises. In order to cultivate the target and construct the corresponding syllabus and teaching content system, it should be an important content of the reform of vocational education in our country.

(4)As the cross-enterprise training center has other unparalleled advantages in the former East Germany region is increasingly used as a training mechanism inadequate remedial measures. For our country, many small and medium enterprises are difficult to hold a separate vocational education center, therefore, the organization of enterprises jointly organized by the industry or by the cross-business training center will be a very important way to develop vocational education.

### **Based on the Drawing of the Post and Qualification Certificate**

The draft is a job in the mold industry. The work of the plotter is mainly auxiliary design engineers (including mold design engineers, product design engineers or project engineers) to draw drawings, including the drawings of the product parts of the three-dimensional map and drawings. Due to the different size of the company, the business philosophy is different, the staff engaged in this position is slightly different.

The main work of the drafts as follows:

(1)By the engineering and technical information manager to arrange the workload, on time to complete the tracing, blueprint task.

(2)According to the information provided by the competent engineers, in accordance with the construction units to complete the drawings of the format requirements.

(3)According to the information provided by the competent engineers, in accordance with the construction units of the completed drawings of the format requirements, accurate completion of the tracing work;

(4)To ensure that the description, blueprint, binding quality, unqualified, substandard information can not be provided to the competent engineer;

(5)Strictly abide by the operating practices of blueprint machine, and do maintenance work  
Mechanical drawing of the certificate is divided into three levels: a two-dimensional digital modeler is cad grade certificate, two is a three-dimensional digital modeler is three-dimensional mapping, application Pro-E and other three-dimensional software, three is three-dimensional digital design division.

## **Teaching Reflection and Advice**

“Mechanical Drawing” should be set up after the students know the internship, the students have a sensory understanding of mechanical processing and then learn to be interested in some knowledge of the understanding will be more in-depth. Physical models, stereograms and animations, will be very helpful to the analysis and understanding of institutions. Correct attitude, to overcome the difficult emotions, serious completion of each homework, and gradually will form a space thinking, the back of the study has a positive impact.

Each lesson 90 minutes, arranged about 20 minutes of review and new knowledge of the teaching, the rest of the students practice time, through the inspection found common problems, unified explanation, you can also set some problems prone to error, try to explain the process by the students, The teacher only played a guiding role, because if the students can accurately express his thinking process, it shows that he has a very good grasp, by giving the other students to explain, but also make him very impressive, but also exercise the language expression ability.

CAD as the most commonly used drawing tools, but also to master the theoretical knowledge and the establishment of the concept of space after the computer program can be used to achieve the function of graphics, a lot of facts have proved that there is no manual drawing the basis of direct drawing with the computer is not The Students master the ability of the software is very strong, the general study of the basic drawing command and editing commands can be painted after the difficulty is to read the map, rather than the use of the software itself.

“Mechanical Drawing” As an important basic course, the core lesson is for the back of more specialized courses and production training to lay the foundation, because if you do not understand the drawings, then the programming, processing is empty talk. This is the teaching feature of this course, through PPT, animation, model, etc. can effectively help students understand the complex shape. In the actual teaching, according to the student's situation, constantly sum up, constantly modify, find the most suitable way to feedback to the classroom.

## **References**

- [1] Tang Jiancheng. Mechanical drawing and CAD foundation. Beijing: Beijing University of Science and Technology Press, 2013.
- [2] Ma Yirong. Engineering drawings and CAD. Beijing: Mechanical Industry Press, 2011.
- [3] He Mingxin. Mechanical drawing. Beijing: Higher Education Press, 2010.
- [4] Xu Mao Gong. Tolerance and technical measurement. Beijing: Mechanical Industry Press, 2013.
- [5] Liu Zhaoyu, Wu Zhijun, Gao Zhengyi. Mechanical drawing. Beijing: Higher Education Press, 2006.