

# Mechanical Drawing Teaching Reform and Innovation

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**Abstract.** The mechanical drawing course is an important foundation for Mechanical Engineering courses, but also practical tools lesson. Require students to grasp the importance of the teaching curriculum for mechanical drawing paper from the current status quo of teaching mechanical drawing course start domestic presented at domestic universities mechanical drawing course teaching needs reform, focusing on analysis of the specific measures mechanical drawing teaching reform for teaching reform provides reform.

**Keywords:** mechanical drawing, teaching reform, teaching mode.

## 1. Introduction

Mechanical Drawing is a Mechanical Engineering important technical basic course, also an important skill training courses, course content has a certain degree of difficulty, but very practical. With the continuous development of manufacturing, machinery manufacturing has already entered the high precision and advanced age, so that the machinery put forward higher requirements for students. Because the content of the courses range of knowledge abstraction, so students learn more difficult, there has been boredom in learning. How to reform and innovation of teaching methods to stimulate students' interest and motivation, students' comprehensive ability, so that students will actually use this technology.

## 2. Situation Analysis of Mechanical Drawing Teaching

### 2.1 Teaching process attention to teaching the basics of the neglect of the development of the discipline

"Mechanical Drawing" course not only to solve the basic problem of cartography, but also pay attention to a variety of practical problems that will be faced by the actual work. Through classroom instruction, students' ability to train skilled application mapping software, but also to cultivate students' ability to perform hand-drawing, so that it can truly be able to good graphics, indispensable between the two, if the trade-off, it will affect the future course of study. If you want a good solution to the practical work of mechanical drawing this issue, it is necessary in the usual classes and training process, so that theory with practice, increase training intensity, in the process drawing particular attention to the typical basic cartographic training This can be in the drawing that can learn by analogy, a loss, there are particular to the general, so as to improve students' comprehensive charting capabilities.

### 2.2 In this paper, the process of teaching attention to teaching courses while ignoring cross between disciplines.

Are interlinked between knowledge, especially edge science and high-tech fields. Now we have entered the age of information, new knowledge and technology advances, permeability and cross-cutting between the various disciplines is more prominent. Today's society is needed is a comprehensive development of talent, a person not only to master the basic curriculum knowledge, but also to understand the variety of information related thereto, so that it can truly become a great talent. We also note that the contact in front of the teaching curriculum and the subsequent course of the school. Therefore, teachers in the teaching process, we must help students understand the

crossover between have met in the learning process discipline problems, so as to enrich the students' knowledge and expand their horizons, to improve students' imagination.

### **2.3 Teaching process attention to teaching theoretical knowledge and practical knowledge of contempt.**

"Mechanical Drawing" teaching process, most teachers' excessive emphasis on theoretical knowledge but practical knowledge of neglect, the course itself is a highly practical discipline, only the importance of the practical courses, to be able to meet course requirements for students to be able to meet the business and social talent requirements. Today's mechanical drawing not only to learn hand-drawing, but also to learn computer graphics, which requires teachers to teach the course, one should pay attention to the cultivation of students' basic knowledge and ability, but we also need to strengthen the students hands-on ability.

## **3. Mechanical drawing course teaching domestic universities need to reform**

### **3.1 Mechanical Drawing teaching targeting needs to improve**

Syllabus emphasis projection rules, views expressed in simple 2D and 3D CAD drawings knowledge. Domestic mechanical drawing and drawing materials rarely involved very closely associated with the design of the application content, mainly to introduce the projection rules and resolve national mechanical drawing standards-based, studied mechanical drawing course I do not know why and learn, learn what to do, how the future a lot of people do.

### **3.2 Contact teaching content and practical application of the need to strengthen**

Teaching content to be used in the production of design practice less than 20%, especially in the drawing size and technical requirements labeling does not focus on testability and workability, most consistent compliance with the principles of the design basis, which is higher education abroad or vocational education focusing closely the actual production of a tremendous contrast. How to narrow the gap to enhance our strength in this project is teachers must ponder and to solve problems and improve the standard of teaching mechanical drawing as a whole.

### **3.3 Teaching model needs to be updated**

Teach effectiveness over the years not significant. The total cannot escape from the classroom teaching model-based professor; complete a simple job, supplemented by the local knowledge of the corresponding class teaching mode. Course lack of comprehensive, in-depth nature, closely linked with the practical application of practical teaching, but also the lack of an objective assessment of learning outcomes evaluation methods, causing students to apply the knowledge to solve practical problems are not properly exercise and improve. Especially the lack of guiding students' in-depth study of more complex mechanism design of the project could not be better stimulating students' independent learning potential.

## **4. Specific measures Mechanical Drawing Teaching Reform**

### **4.1 grasp the basics, having a good first lesson**

Studies have shown that students' first impression of the teacher or the curriculum is very important, successful or not first class, students learn not only to determine the effect of mechanical drawing, but also to determine whether students are interested in the future of the course or whether there is to learn confidence of the course. Therefore, the teacher before class lectures not only want to be screened, but also the means or methods for teaching should be and try to figure out some scrutiny, the only way to lay the foundation for future mechanical drawing course teaching. So we in class before, be sure to let the students can set their favorite work interface according to personal preference, to enable students to master basic drawing and basic computer operations. If our basic teaching drawing also used in the past to carry out an old teaching methods, then we do not give students a good impression, while not allowing students a firm grasp of these lectures, taught first before teaching basic drawing knowledge, and then explain accurate drawing methods, so let students not only mastered the knowledge, but also cultivate interest.

#### **4.2 Change the teaching mode, stimulate interest in learning**

Past teaching mode is basically spoon-feeding teaching, teachers teach, students learn and what teachers teach, students learn what passive. This traditional teaching mode, cannot mobilize the initiative of students, especially in the dry, abstract, drawing lessons from complex, difficult for students to understand and accept the content, so there is the case of weariness may occur. Therefore, we in the usual teaching process should fully mobilize the initiative of students, using their own inquiry-based teaching model, the teacher to student-centered, using guidance, inspiration, discussion, discovery, thinking, summarizing a variety of teaching methods and means to enhance students' interest "Mechanical Drawing", and to the idea of the contents of the book will guide students to answer questions in the process of life, and to deepen students' understanding and application of knowledge. On the mechanical drawing class, we can give the students into groups and then each group to a model that let students study their structure, so figuring out how to express the parts in the drawings, including the basic structure and the basic dimensions, which makes use of physical stimulate student interest, enable students to model and part has perceptual awareness, teachers, giving students mainly for teaching students the ability to think independently, problems and problem-solving skills to find.

#### **4.3 Optimization of teaching methods, improve perceptions**

"Mechanical Drawing" course has a strong practical and intuitive, so in the course of the class teacher to constantly optimize their teaching methods, combined with lectures can use flexible teaching methods. Advanced teaching methods are: a variety of teaching methods of physical education, multimedia teaching and teaching model to improve students' perceptions. This will not only compress the class, but also improve the learning efficiency, improve students' knowledge structure, broaden their knowledge. Good condition or have counterparts school internships can lead students directly to the internship, on the one hand allows students to visit the unit work processes, on the other hand can be used to allow students to collect some drawings or obsolete parts, by drawing for parts content and assembly drawings, parts by parts to understand the shape, structure, function and so on, so as to help students fully understand the "mechanical Drawing" course content. For individual chapters must be taught by means of projection technologies in the process of production of courseware can be combined with the actual situation, using a variety of software combines courseware, courseware enhanced intuitive and vivid.

#### **4.4 Strengthening discussion teaching, focused, Overcoming Difficulties**

With the continuous development of higher education, quality of students under the declining enrollment. This underscores the teachers in the actual teaching process, we should pay attention to selection of teaching materials, and clever use of a variety of teaching methods, such as integrated method, analysis, induction, et; focus on refining the teaching materials, and to strengthen the mapping methods, synthesize the views characteristics and other content. At the same time, focus on teaching content, breakthrough difficulty, so clearly the difficulty of teaching, scientific arrangements to facilitate the teaching content, but also conducive to the students for knowledge acquisition. In the teaching of mechanical drawing, there is some confusion or neglect content, teachers can be translated into specific issues, and organize students to actively explore in order to strengthen knowledge and understanding confusing. Teachers in the teaching plan, should reflect more "human" concept, the actual situation of the students may be. More conducive to the effective implementation of such teaching, to form a good interaction between teachers and students is an important manifestation build an effective classroom teaching.

#### **4.5 Through intuitive teaching students the space of imagination**

Teaching in mechanical drawing, visual teaching has an important position, in which the multimedia teaching and physical education, in the actual teaching of the use of high frequency. By visual teaching helps students memorizing and understanding of abstract theories, especially the complex spatial view, effectively translated into concrete image, easy to master the content, which helps students better understand learning. Students' tangible kind, in terms of memorizing and understanding, much better than abstraction. Therefore, the visual is to develop an effective way of teaching students good space imagination, the ability to allow students to form a three-dimensional

feel. Teachers in the actual teaching, teaching mold through an intuitive and give proper explanation for the teaching content, which is more difficult to learn drawing, you can play anything easy results. For example, teachers in the teaching of "cross-sectional view," the course content, the author found that students easily confuse a sectional view sectional view, for this situation, I would use physical models, disconnect parts of the painting in its hatching. In this way, students can clear distinction between cross-sectional view and a sectional view, help students grasp the main points of knowledge, understanding of relevant knowledge learning.

#### **4.6 Use of multimedia in teaching**

To do a good job teaching mechanical drawing of this course, in addition to improving their own quality teachers, improve teaching methods, reasonable arrangements for the course, but also should make full use of advanced teaching methods. One advantage of this advanced multimedia teaching methods to achieve a multiplier effect. Using the computer allows students to shape and structure of space has an intuitive feeling, and by observation, and then come up with a view to draw the shape and structure of the object according to the view. While the use of multimedia, three-dimensional graphics can draw all kinds of objects, which can be arbitrarily enlarge this graphics in space, rotate, allowing students to observe them from different directions, this way, students will be able to understand and master the three-dimensional shape of the image realistic, students from multiple angles to ask questions of the projected change, and the formation of three views, but also to the difficulty of learning a corresponding reduction of knowledge to improve the spatial imagination, help to improve students' enthusiasm and interest in learning, experience fun mechanical drawing learning.

### **5. Summary**

"Mechanical Drawing" course teaching reform needs theory with practice, to improve the efficiency of classroom teaching quality and takes full advantage of modern teaching techniques and teaching methods. Teachers in the teaching process to continue to reflect, through reflection and constantly improve their teaching methods and procedures, the mechanical drawing as an important quality of teaching and student career technical basis to culture. , But also for teaching bold reform and innovation, and fully mobilize the students 'enthusiasm and initiative, adopt flexible approach in the new curriculum ideas to improve student interest in learning, improve students' ability to learn.

#### **References:**

- [1] Young, M. Bring Knowledge Back in Theoretical and Applied Studies in Sociology of Education [M] .To are published, 2002:22.
- [2] Ulrieh Gabbert , Tamara Nestorovie , Janko Wuchatsch . Methods and Possibilities of a virtual design for actively controlled smart systems [J]. Computers and structures.2007,(3):1-11.