

## Reform and Research on the experimental teaching system of Mechanical Engineering

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### Abstract

Explore the reform of experiment teaching method, update the experimental teaching mode, to reform the experimental teaching methods, and promote the construction of laboratory information and network. Speeding up the laboratory opening, strengthen team construction of experimental teachers, to lay the foundation for the establishment of the ability of the experimental teaching system, in order to establish the ability training of the experimental teaching system to lay the foundation.

### Keywords

Mechanical Engineering; Experimental Teaching; Talent Training.

### 1. Introduction

Practical teaching is an important part of the cultivation of talents, which is very important to improve the students' practical innovation ability and the quality of higher education[1]. On the international, the American and German higher education personnel training mode is more successful, the United States of higher engineering education has obvious "Engineering Science model", while Germany is more emphasis on skills model"; the difference is that the basic training of German engineers is accomplished during the school period, and the United States is realized through school and enterprise training[2].

In China, mechanical discipline each year for the enterprise to transport a large number of equipment manufacturing personnel, and enterprises in the selection of talent, more favor in the hands of strong, practical experience of students, rather than spending time and money to train the graduates of the University, this is virtually the task of making the college students' practical ability. The mechanical laboratory has become an ideal base for cultivating students' practical ability and innovative consciousness, students can understand the basic theoretical knowledge through experiments, , improve the ability to analyze and solve problems; The experimental teaching is to focus on the students "knowledge, ability, quality" of the comprehensive development, is an important link of improving students' ability and innovative thinking, is an important part of College Students' cultivation[3].

### 2. Exploration of talents training and reform ideas

#### 2.1 Explore training ways of innovative talent

The reform of experiment teaching should follow: "Talents training should strengthen students' innovative consciousness and practical ability, and broaden the thinking of the main", to strengthen the foundation, expand the professional, pay attention to practice, effectively combine production, learning and scientific research.

Based on the cultivation of learning ability and practical ability, the core of innovation ability cultivation, exploration, optimization and improvement of curriculum system, constructed the teaching content which is suitable for the students to explore the spirit, scientific thinking, practical ability and cultivation of creative ability. The implementation of the experimental teaching by stages, the modular teaching mode, outstanding level-division, personalized training. Through the experimental teaching of mechanical basis, engineering training, professional experimental teaching and scientific and technological innovation activities, a series of experimental teaching and training, so that the innovative training model covers the students from the entrance to the graduation of each stage.

## **2.2 Exploration of experimental teaching reform method**

Follow the train of thought of innovative talents, the reform of the teaching content of mechanical experiments. According to the basic type, design comprehensive type, research and innovation to plan the experiment, reduce the verification experiments, the addition of design comprehensive experiments and research and innovative experiments. Integrated teaching resources, optimization combination of teachers, sharing instrument and equipment, improve the usage rate of the laboratory, to achieve the "three of get through teaching": basic laboratory and specialized laboratory, teaching laboratory and research laboratory, undergraduate laboratory and graduate laboratory[4].

## **3. Reform and practice of experimental teaching**

### **3.1 Update experiment teaching mode**

In the experimental teaching activities, the experimental project can be optimized and reorganized according to the basic type, design comprehensive and innovative experiments; to carry out experimental teaching in the order of easy to difficult and from simple to complex. The interaction between theory course and experiment course teaching, teaching activities and scientific research is added. To achieve the theory course can guide experiment course teaching, experiment course teaching can promote the understanding of theory course; Undergraduate students can participate in scientific research projects, new knowledge of scientific research, new theory into teaching activities, scientific instruments and equipment and teaching equipment are intercommunicating, scientific research and teaching on mutual promotion .

### **3.2 Reform experimental teaching method**

According to the characteristics of mechanical engineering experiments, the students' cognitive rules are considered comprehensively, and the teaching methods and models of students' self training are established according to the characteristics of different subjects. The teacher uses the heuristic teaching method to teach the students the basic theory of the experiment, the experiment technique principle, etc., to mobilize the students' learning initiative, to understand the use of the experimental apparatus and equipment, to achieve the indigenous design of the experimental scheme, under the guidance of the teacher to complete all the experimental process. In the teaching should pay attention to broaden the students' knowledge, to carry out the experimental teaching of multidisciplinary, to encourage students to cross-discipline elective experimental course.

### **3.3 Promoting laboratory network and information construction**

Through efficient and fast network, students can view the teaching syllabus, electronic teaching plan, and can download multimedia courseware, video and other teaching resources; students can better preview or review the content of the experimental course through the network, accurate grasp of the knowledge. Through the experimental teaching of the website, the students can carry out the network answer, but also can query the distribution and using condition of the laboratory. Promoting the construction of network and information in the laboratory can make the teachers and students more reasonable to arrange the experiment teaching content, and to improve the level of experiment teaching and working efficiency[5].

### 3.4 Strengthen laboratory opening construction

University laboratory is the main place for the implementation of quality education, training students' innovative spirit, practical ability and comprehensive quality. Schools should open to the conditional laboratory for students, pay attention to the cultivation of students' innovation ability, practical ability and entrepreneurial spirit, to achieve resource sharing, improve the use efficiency[6].

Laboratory opening to different levels of students, different subjects and different grades of students can go to open laboratory to do the experiment, different subjects and different grade students can go to open laboratory to do the experiment, to provide students with the opportunity to experiment. To encourage students to be interested in the problem of their own, and to find out the problems in production and life, the phenomenon in the research activities, through the literature review and reference books to design a specific experiment plan and steps, after the tutor's review to carry out experiments.

## 4. Strengthen the construction of experimental teachers

According to the requirements of the development of modern mechanical manufacturing engineering, combining with the requirements of the experimental teaching system of mechanical engineering and the cultivation of talents, build a reasonable age structure, academic level and academic level is higher , noble moral of teacher team is very important .

In increasing the intensity of talent introduction, for personal reasons or not suitable for experimental teachers, should be a reasonable transfer. The low level of ability of the experimental management personnel and the experimental teachers, can take effective measures, such as to encourage teachers to advanced study or further education, and gradually improve teachers ' diploma level and the ability of guiding students' experiments[7].

At the same time to improve the business level of full-time teachers, , according to the experimental setup and the experimental content of the need to hire a company with engineering experience of the engineer as a practical and innovative experiments of a part-time teacher. Part time teachers according to the experimental teaching situation can be hired, optimizing and selecting. Part time teachers according to the experimental teaching situation, it can be dynamic hired, preferred and selecting.

## 5. Conclusions

China is striding forward from large country in engineering education to a powerful country, the rapid development of social economy not only changes the people's production and life style, but also puts forward higher requirements for engineering education, , the engineering practice ability and innovative spirit of the mechanical engineering students are becoming more and more obvious. To innovation consciousness, innovation ability training as the goal, the talent quality assurance as the fundamental, based on the discipline construction and the cultivation of professional talents, the overall level of mechanical engineering experiment teaching can be effectively improved through the reform of the experimental teaching system and the open experimental teaching mode. To cultivate students' scientific experiment ability, comprehensive design ability and product innovation ability has played a good effect.

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