A Preliminary Study on the Training of Newly Founded Local College Students’ Engineering Ability

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Abstract. According to the research of current college students' engineering ability training from the statistical analysis of the questionnaire, the existing problems of engineering ability training of newly founded local college students in various aspects including talent training program, laboratory and practice base construction and the construction of "double qualified teachers" were discussed in this paper. This paper proposed to improve students engineering ability from the following aspects: a strong teacher team, a distinctive talent training scheme, a certain practical teaching conditions and a set of effective policy.

Introduction

Engineering\(^1\) is refers to the general term of various scientific which is formed by applying the principle of natural science to industrial and agricultural departments. These disciplines were developed by applying mathematics, physics, chemistry and other basic scientific principles, which were combined with accumulated technical experience in the production practice. With the improvement of social productivity, there is an urgent need for a lot of high-quality engineering and technical talents in our country. But there are shortcomings of training in many aspects that graduate engineering practice ability evaluation is not high in the new colleges and universities, and the students' engineering practical ability doesn't fit with the needs of the enterprises, etc. According to the research of current college students' engineering ability training from the statistical analysis of the questionnaire, some countermeasures are put forward to improve engineering ability training, which are improving the talent training plan, strengthening the construction of practice base facilities, widening the channel of the students' engineering practice activities, strengthening of teaching staff construction and improving teachers' engineering practice teaching ability.

The Connotation of Students' Project Ability

Higher education laws stipulate explicitly that the fundamental task of higher education is to train the advanced specialized personnel with innovative spirit and practical ability\(^2\). Higher engineering colleges are the cradle for engineers. Academician of the two academies Lu Yongxiang proposed: Engineers in the 21st century must be at least ready to answer the following four problems,\(^3\) which better reflects that the students should have the connotation of engineering ability.

The first issue is whether you will be able to afford to do it when you face an engineering technology and even scientific and technological problems.

The second issue is whether it is worth doing. You are able to accomplish the task economically and reasonably under the constraints of human, financial, material and time requirements.

The third issue is whether you can do things in accordance with the law and reason under the premise of policies and regulations, social morality and cultural customs.

The fourth issue is whether you should be able to do things. Consciously considering the feasibility of ecology, you contribute to sustainable development with professional technical work.
**Problems in Engineering Ability Training**

From the statistical analysis of the questionnaire, there are some unavoidable problems that are highly concerned in the training of engineering practice ability of newly built undergraduate colleges, which are illustrated in Figure 1.

![Diagram](image)

**Figure 1. Problems in engineering ability training.**

**The Imperfection of Talent Training Program**

Under the circumstances of the social education, the newly built universities educational goals are optimizing the positioning continuously with the new policy. Therefore, the talent training scheme has undergone multiple revisions and becomes more reasonable. But the talent cultivation scheme should be focus on application and the road of characteristic development for applied talents cultivation. There are problems that development orientation of applied undergraduate colleges and universities must adapt to the actual needs of the economic and social development, the national requirements for the cultivation of the talent and the pace of the local economic development. Specifically, personnel training program needs to be improved in training of front-line application talents in the field of production, management and services, the applied research being closely related to local and industry development, services to regional social economic development.

Especially due to objective reasons, some teaching experiments are done without conditions, and some training can not be completed. it is mainly reflected that the general practice teaching link in the teaching experiment, basic skills training, professional skill training and comprehensive ability training exists the gap of arrangement and cultivate the ability, at the same time, there is a problem of content overlapping in some courses, unknown contribution of the opening of a course to the student ability training.

**Laboratory and Practice Base Construction Can Not Meet the Requirements**

Most of the practical teaching funding is not enough in new colleges and universities. In recent years, The laboratory construction had great progress, but the verification experiment, designing experiment and comprehensive experiment can not meet the teaching requirements. Practice bases construction also has some achievements, but there's a lot of work for undertaking the practical teaching task of students.
The Construction of "Double Qualified Teachers" is Not Enough

Applied talents cultivation can be considered to be embodied in the "academic, technical, professional" ability and the cultivation of students' practical ability in some extent, which depends on the construction of internal quality of teachers team that can be engaged in specialized theoretical teaching and professional practice teaching in a large extent.

At present, practice teachers are serious lack and professional structure is unreasonable in the newly built colleges and universities because of the development history, especially the serious shortage of teachers with engineering background ability. While Most teachers, especially young teachers lack in the front line work experience of production, construction and management, who have profound theoretical foundation and are lack of practice ability. Teachers adopt teaching method of emphasizing theory and underestimating practice, which leads that students are familiar with theoretical knowledge, but the practical ability is very weak.

The Thinking of Engineering Ability Training

Design and Implementation of Application-oriented Undergraduate Training

Colleges always pay attention to the core of the transformation of personnel training model, focus on repeated research, conduct social investigation, and carry special management revision of personnel training programs which should take the cultivation of applied ability as the main line around the training objectives, the necessary knowledge, ability and quality structure, aim at professional assessment and engineering certification, and emphasize the cultivation of students' profound engineering culture at the same time.

By increasing the content of the related engineering background in the specialized courses, open teaching mode based on combination of production and study with research, modern teaching methods, and the teaching system are adopted, which are highlighting the dominant position of students, students' practical ability, and the cultivation of solving practical problems and innovation ability. It has strengthened the practical teaching sections through the link of the general education practice, the practice of professional education and the integration of comprehensive education practice.

Students are organized to carry out the corresponding practical learning and comprehensive training every year from freshman year to senior year. In the practice teaching link, with outstanding case and case teaching, students understand the project and study in the aspects of scientific research demonstration, construction management, acceptance evaluation, social and economic benefit evaluation on the spot through project tracking practice, which creates a good environment and atmosphere, and cultivate students' good engineering consciousness and engineering quality. In short, it is necessary to cultivate students' ability to solve complex engineering problems, and to train students' ability to solve complex engineering systems throughout the four years of undergraduate education.

Building Practice Teaching Base to Cultivate Students' Engineering Ability

Colleges should be based on the present status, make greater progress, and deepen the reform of practice in order to improve the practical ability of students. Colleges should be focus on cultivating students' practical ability, analyzing and solving problems.

In the construction of the laboratory, colleges should integrate existing laboratory resources, consider firstly the teaching requirements of the experiment in the talent training scheme, make full use of the brothers department laboratory equipment resources in order to avoid duplicate construction. “Three open teaching” is implement, which is the opening of experimental teaching courses and projects, the opening of experimental facilities and the opening of experimental time.

Reducing the verification experiment, increasing and encouraging the comprehensive design experiment, departments should be combined with the professional characteristics, establish a wide range of cooperation between enterprises, and built the practice and training base into a real practice
teaching place for students. By using a variety of practical teaching models, and combining simulation training with practicing in practice base, curriculum theory design with real engineering design, students participate in teaching activities with the project targeted training, which improves students' ability to solve practical problems.

**Measures of Strengthening Practice Teaching Team Construction**

Colleges should recognize that practice teaching is a very important part in the whole process of talent training in order to ensure the cultivation of students' practical ability. Therefore, in the process of talent introduction, In addition to the introduction of "high", "big" and "fashionable" talent, the introduction of practice teaching staff should be taken into account such as introduction of practice ability of engineers of some certain theoretical basis from the enterprise and engineering. At the same time, it is necessary to update the teachers’ concept to emphasize on practice teaching.

According to different specialties, teachers lead the students to work together in the first line of production in order to improve the practice teaching level in the pressure of the guidance internship through cooperating between schools and enterprises or constructing practical training base, allowing teachers to business to work and training in the summer. It is need that we take the policy measures to achieve the "double teacher".

**Summary**

In a word, the cultivation of students engineering ability must have a strong teacher team as the foundation, have a distinctive talent training scheme as a guide, have a certain practical teaching conditions and have a set of effective policy, which can cultivate students' good engineering consciousness and engineering quality.

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**References**