

Exploration and Practice of Teaching Reform of Engineering Survey Course in Applied Undergraduate Colleges

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Abstract: Based on the requirements of new engineering training, we analyzes the current status of the construction industry and the current status of applied undergraduate students. We expounds the current curriculum of the civil engineering professional "Engineering Measurement". We put forward some new measures for the teaching reform of the course from the aspects of teaching content structure and teaching methods.

I. Introduction

In recent years, China's construction industry has boomed. The large-scale infrastructure construction is in the ascendant. With the continuous rise of urban construction, the employment situation of civil engineering majors has continued to rise in recent years. The demand for talent in the housing and civil engineering construction industry has jumped to the top. Especially in the past 5 years, the state has vigorously promoted the construction of sponge cities and comprehensive cities. The demand for graduates of civil engineering majors has been increasing day by day.

Engineering education should be closely linked and supported by industry development. At present, the new economy represented by new technologies, new formats, new models and new industries is booming. It puts higher requirements on engineering and technical personnel and has higher standards for the overall quality of students. What is urgently needed in the future emerging industries and the new economy is high-quality compound talents with strong engineering practice ability, strong innovation ability and international competitiveness[1].

"Engineering Survey" is a very practical professional foundation course, which is set up in civil engineering majors in China's universities, such as civil engineering, engineering cost, and project management. Its main task is to enable students to master the basic knowledge of engineering survey, basic theory and basic methods for measuring various factors (height, angle and distance) to lay a solid foundation for future work. Combined with market research and analysis, They are required to not only have a deep academic study in their majors, but also have the ability to "cross-disciplinary integration". They are required to not only use the knowledge they have acquired to solve existing problems, but also to learn new knowledge and new technologies to solve problems in future development. However, in terms of structure and quality, the side of talent cultivation supply and the side of industry industry demand cannot fully adapt at present.

II . The Application of Undergraduate Civil Engineering Professional Social Situation Analysis

At present, the civil construction industry has established a relatively comprehensive practice qualification system. The demand for engineering and technical personnel has also continued to increase. While providing good employment prospects, it also puts forward new requirements for the training of civil engineering professionals.

The construction industry is an important material production sector of the national economy. It is closely related to the development of the entire country's economy and the improvement of

people's lives. With the proposal of the "One Belt, One Road" and "Made in China 2025" national strategies, China's construction industry is developing rapidly. Construction industry new business, new models, new technologies continue to emerge, the construction industry is experiencing a new round of human resources shortage: It is from quantitative shortage to structural shortage. At the same time as the surplus of human resources in traditional business, the reality of the shortage of high-tech human resources is gradually emerging. Compared with the shortage of quantity, the structural shortage is more difficult to make up. It is difficult to balance supply and demand in a short time. Therefore, technicians who are proficient in various professional skills become scarce talents. After investigation, the employment positions of applied undergraduate civil engineering students after graduation include: supervisors, surveyors, technicians, construction workers, cost engineers, etc. By analyzing the job responsibilities and tasks of different positions, the course design should be carried out according to the professional ability requirements of the jobs corresponding to the engineering survey course.

The current student body has many different qualities, because of the differences in the environment and lifestyle of the times. They are open-minded, independent, and confident; they are super confident in teamwork and new things. They have high demands for learning opportunities and training systems. They are active in thinking, willing to practice, and have strong hands-on skills. They are innovative and critical. However, their foundation is relatively weak and their learning initiative is not strong. This generation of students tests every teacher. Therefore, I believe that today's teachers can no longer use the method of yesterday to teach students. In addition to using the hard power of professional technology to design courses, we also need the soft power of education wisdom to control the classroom. This is a combination of "soft and hard" to create a course that students prefer.

III. The Status of Engineering Survey Courses for Civil Engineering

Through the investigation of the syllabus of the "Engineering Measurement" course of the civil engineering majors of many applied undergraduate colleges, we found that the teaching content is mostly consistent with the teaching materials. Its contents basically include "introduction, leveling, angle survey, distance survey, basic error theory, control survey, basic knowledge of topographic map, large-scale topographic map mapping, building construction survey, deformation observation, etc." The teaching method is mostly based on the theory teaching + practice. In accordance with the requirements and objectives of the "new engineering" talent training, we interpret the teaching objectives of civil engineering professional engineering measurement courses. As a professional basic course, this course plays an important role in the entire professional talent training system. What needs to be cultivated is a specialized engineering and scientific talent who understands technology, applies, and survey and map. It should be guided by market demand. It should be based on engineering measurement practice. It should be based on advanced engineering measurement technology. It should aim at cultivating students' professional abilities[3]. However, the current curriculum content is relatively independent, with a wide range and a large amount of content, which leads to students' poor grasp of difficult points and weak ability to comprehensively apply knowledge. At the same time, some of the content lags behind advanced survey and mapping technology. It has a certain gap with the training goal of reaching the application-oriented undergraduate "new engineering" talents.

IV. Take More Measures to Deepen Teaching Reform

1. Optimize Teaching Content And Adjust Teaching Content Structure.

Combined with the above-mentioned analysis of the social situation of the construction industry and the current status of applied engineering undergraduate engineering survey courses, the reform of the course content should not be delayed. It is necessary to construct a curriculum system based on the measurement of basic theoretical knowledge and modern measurement technology as a

means to meet the needs of engineering survey. Teaching content must be adapted to the development of new technologies and applications. We should keep up with the times and cut out the outdated content. It should be combined with the requirements of professional positions in civil engineering, emphasizing modern surveying and mapping content and engineering applications. We adjusted the structure of the course content and put the basic knowledge of measurement error forward so that students can understand the basic theory of error before learning the actual measurement skills. We compress and combine the three basic tasks of measurement (including leveling, angle, and distance). According to the professional ability requirements of the students, we will make the construction survey part specific to the basic knowledge of engineering control network and construction stakeout; We have added a modern measurement technology section, focusing on explaining the application of current advanced measurement technology in engineering.

2. Reform the Organization of Classroom Teaching.

Combining the analysis of the academic situation of current students, we must to change the traditional teaching mode and continuously reform and innovate teaching methods. We must to give full play to students' advantages and to stimulate their enthusiasm for learning. In the course of course implementation, the traditional model of classroom learning LBL was broken and replaced by the whole process of participatory learning. Before the class, teachers can use the learning platform to arrange related learning tasks for students. Students can consult the materials and share learning materials such as micro-lessons and videos for their reference before class to achieve autonomous learning. In the process of students' autonomous learning, teachers can interact with students online and answer questions in real time. At the same time, teachers can also use teaching assistant software to publish related tests before class. This is the pre-test in the "Boppps" teaching method. Through targeted tests before class, students and teachers can understand the lack and deficiency of knowledge. It is easy to check and fill in gaps in the learning and teaching process. In addition to traditional lecture presentations, you can also explore various forms to diversify the organization of teaching in the classroom. For example, we can improve the students' practical ability, expand their comprehensive qualities, and cultivate the spirit of innovation and teamwork by holding engineering survey competitions at different levels. After the class, we can require students to write a summary report after the task is completed, and summarize the gains and losses in the process. We can establish measurement-related student associations. It can stimulate student learning interest through community activities. In the community, senior students use their specialties to teach skills to young students.

3. Reform of Assessment Methods.

For the "Engineering Survey" course, the current assessment method generally consists of 30% of the procedural assessment+ 70% of the final examination. It focuses on assessing the theoretical knowledge of books. And it is easy for students to form the concept of emphasizing theory rather than practice, which is not conducive to the cultivation of students' ability [4]. At the same time, it is sometimes difficult for traditional final examinations to reflect the real situation of students' knowledge and skills. Therefore, it is necessary to change the traditional assessment method. We can adopt a comprehensive assessment method, such as increase the proportion of procedural assessment. The procedural assessment focuses on the mastery of professional skills during the examination of students. The final examination mainly examines students' grasp of basic concepts and basic theories. During this period, through exchanges with students, appropriate points will be given to students who have strong practical skills and can provide unique insights in practice. This can encourage students to think positively and be creative. If students win awards in major-related competitions, they can get different bonus points. In this way, students' interest in learning will be stimulated to achieve the effect of promoting learning through competition and promoting practice through competition.

V. Conclusion

Engineering surveys run through various projects and play a very important role in the survey and design, construction stakeout, completion acceptance, and operation management stages of each project. The demand-oriented "new engineering" talents are urgently needed by enterprises. For students majoring in civil engineering, they must be proficient in the basic skills of engineering surveying. This will lay a solid foundation for future related work, and strive to achieve graduation and employment "seamless." Most of the teaching reform methods proposed in this article have been implemented in the civil engineering specialty of our school for 1-3 years. The effect of teaching reform is quite significant. In the future, we will continue to deepen the reform of curriculum teaching and promote good teaching reform experience to other civil engineering majors.

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