

Analysis on the Construction of Civil Engineering Practice Based on CDIO Concept

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Abstract: Civil engineering major has strong practicality. In the specific teaching work, in order to improve the quality of practical teaching, it is necessary to build a practical teaching system. During the specific construction period, the CDIO engineering education concept is integrated into the professional teaching, and the practical teaching system of civil engineering majors is considered from different aspects, which can provide strong support for the training of civil engineering professionals. Based on this, this paper analyzes the CDIO concept and discusses the idea of building the practical teaching system of civil engineering major based on the CDIO concept.

Keywords: CDIO concept; Civil engineering major; Practical teaching system; Construction ideas

In the modern engineering education, the CDIO concept, as a new educational concept, can be applied to the specific teaching, and can provide guidance for the practical teaching work. As an effective teaching way to consolidate the theoretical knowledge in teaching and enhance its comprehensive practical ability, practical teaching plays a good role in cultivating students' innovative consciousness and comprehensive ability. It is necessary to strengthen the research of CDIO concept in the teaching of civil engineering major, and apply it to the construction of practical teaching system, and give full play to its role and value.

1. Overview of CDIO concept

CDIO concept as the early 20th century, the Massachusetts institute of technology and the Swedish royal institute of technology university education reform team put forward the new talent training and education way, to conception, design, implementation and operation process as the carrier, the relevant teaching activities involved in the basic theory teaching, curriculum design and professional experiment into the engineering practice, prompting students to actively participate in concrete practice, in order to realize the student engineering ability^[1].

The implementation purpose of CDIO engineering education mode is to allow students to participate in the design, implementation, operation and maintenance of various activities, deepen the understanding, mastery and practice of the whole life cycle, so as to deal with and solve various problems in the whole cycle of each related project construction. The CDIO concept clearly states that students' engineering skills include not only professional knowledge, but also teamwork, learning, and overall control. To this, in civil engineering professional practice teaching system construction, need to draw lessons from CDIO engineering education concept, comprehensive consider professional curriculum design work, from multiple angles, thinking professional practice teaching system construction, make students to obtain multi-level practice training during learning, to improve their practical ability, practical ability and innovation ability, make it better adapt to the industry and enterprise engineering practice needs.

2. Construction of practical teaching system of civil engineering major based on CDIO concept

2.1 Create a good practical teaching system to build an environment

First of all, the establishment of a professional network practice teaching platform. At present, the network information technology has become a widely used technology in teaching, can build modern professional network practice teaching platform to provide diversified, informatization, automation and digital security, and for teachers, students and practice unit to provide convenience,

through the establishment of network practice platform, set up simulation experiment, practice teaching video modules, can be students online learning, tracking students learning situation, and students learning results evaluation provide great convenience. In the actual construction of the platform, it is necessary to design various types of practical teaching activities from the aspects of design, implementation, operation and maintenance, and provide network experimental teaching course resources and interactive communication platform to help students communicate in learning. At the same time, it is necessary to record teaching images during the teaching process and upload them to the teaching platform, so that students can learn at any time^[2].

Secondly, the construction of school-enterprise joint practice teaching base. In the construction of the practical teaching platform for civil engineering majors, the practical talent training should be carried out based on the CDIO concept, so as to improve the students' engineering practice ability, so as to improve the overall teaching effect. In this process, good conditions must be provided for students' ability cultivation. This needs to strengthen the construction of school-enterprise joint practice teaching base. In this process, first, should combine local high influence construction enterprises, build scientific research, practice teaching and social service in the integration of modern practice teaching base, and the teaching content and enterprise management project, school teaching content, appropriate to expand the teaching content, to cultivate students' practical ability. In the joint practice teaching of the enterprise, the students should work in the enterprise and gradually develop the enterprise, and strengthen their engineering practice ability.

Finally, the implementation of the construction of teachers. Teaching work under the CDIO concept requires teachers not only to have professional teaching ability, but also to be able to carry out practical work in the business environment, and to be able to quickly and effectively complete the actual project conception, design, implementation and operation procedures. In order to train talents, in order to improve students' practical ability, we must pay attention to the construction of teachers. This requires the establishment of a team of teachers with strong engineering practice ability, and the use of their experience and practical ability to strengthen the guidance of students. In this process, it is necessary to strengthen the engineering practice ability of the original young and middle-aged teachers, and encourage them to continue to learn during the teaching period, and master more new knowledge and practical skills, so as to provide more guidance for students. At the same time, teachers should be arranged to participate in various engineering practice training of construction enterprises in a planned way to help them master the latest knowledge of civil engineering major and update their ideas. In addition, front-line production experts from construction enterprises were invited to give academic lectures to continuously improve teachers' professional theoretical knowledge and strengthen teachers' systematic practical ability of civil engineering majors.

2.2 Apply the CDIO concept to various practical teaching environments

In the application of CDIO concept in the practical teaching of civil engineering major, in order to strengthen the guiding role of CDIO concept, it is necessary to start from different links, such as experimental links, practice and design links, and practical science and technology activities. So as to strengthen the students' practical ability, innovation ability, practical ability training, so that they can improve the mastery of the relevant knowledge, so as to improve their comprehensive quality.

First, the CDIO concept was applied in the experimental session. In the construction of the practical teaching system of civil engineering major, the experiment link is the first link, which involves basic courses and professional courses, etc. The related basic experiments are mainly chemistry, physics experiments and material mechanics experiments. Professional basic experiments include engineering surveying, civil engineering materials, soil mechanics, engineering design software application and many other different aspects. The construction engineering professional experiment includes reinforced concrete configuration and other experiments. In the transition from material performance basic experiment to structural performance experiment, in order to highlight the CDIO concept, teachers should give full play to students' independent learning ability, so that they can actively understand the mastery and performance of relevant materials, and participate in the production of materials and master the structure of various materials. Using the process of material making to deepen the mastery and understanding of relevant knowledge, which has a good role in cultivating students' independent learning ability, practical ability and problem solving ability, and can strengthen the cultivation of students' thinking ability and subjective initiative^[3].

Secondly, the CDIO concept should be applied in the practice and design links. In the practice link, teachers need to guide students to master the basic knowledge of civil engineering in the study, and participate in the practice of basic experiment major, so as to improve students' practical skills in engineering, strengthen the training of their engineering thinking, and guide students to integrate social knowledge and professional knowledge in the practice process. Then, by participating in the actual engineering practice process, we can further master the practical skills of civil engineering major, and cultivate the students' teamwork ability and the students'

problem-solving ability. In the teaching based on the CDIO concept, students are required to use the basic knowledge of professional courses to find out the problems encountered in the actual engineering design and solve them, which has a good effect on cultivating students' problem handling ability and learning ability.

Finally, the practice of science and technology activities to carry out the application of the CDIO concept. According to the civil engineering teaching characteristics, the teachers in the teaching process should encourage students to actively participate in the scientific research activities and training programs, and guide students to use the structure design competition to strengthen their scientific research consciousness, enhance its innovation ability, and then in the practice of science and technology activities gradually strengthen their innovation spirit and system coordination ability. During the period of professional practice teaching, it is necessary to introduce scientific research projects into daily teaching to help students timely grasp the latest trends and changes in civil engineering discipline, strengthen the cultivation of students' ability to find problems, explore problems and solve problems, and make them better connect with theory and practice.

Conclusion:

In the civil engineering professional practice teaching system construction, application of CDIO concept can greatly improve the level of professional practice teaching, to better meet the requirements of civil engineering professional personnel training in the new period, can promote students' comprehensive quality and related practical skills, to provide more high-quality talents for social construction and development. In the application process of CDIO concept, teachers should take the concept as the basis, consider from different aspects of experiment, practice, design and other aspects, to explore the effective means to implement CDIO concept, so as to improve the teaching quality of civil engineering major and the comprehensive quality of students.

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