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The Practical Teaching System of Civil Engineering with Innovation Ability as the Core

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Abstract: For the current curriculum practice design of civil engineering majors in colleges and universities, it is required that in the process of practical teaching design, the teaching work should be carried out with the cultivation of students' innovative ability as the core, and the civil engineering practice talents with high professional ability should be cultivated for the country and society. Cultivating the innovation ability of college students can effectively promote the formation of practical talents in civil engineering. Based on this, this paper aims to cultivate the innovative ability of civil engineering students to explore an effective civil engineering practice teaching system.

Keywords: Civil Engineering; Practical Teaching System; Innovation Ability

Introduction

Higher education needs to adhere to the concept of innovation and development, and encourage and promote the cultivation and development of talents' innovation ability. At present, what the country needs is a group of professional civil engineering talents with innovative ability. Therefore, in the design of the teaching system of civil engineering, we must always integrate the concept of training innovative talents to cultivate students' innovative ability.

1. The current teaching system of civil engineering

In the current teaching process of civil engineering in colleges and universities, the teaching of civil engineering is placed under the background of engineering and practical education, and the teaching system of civil engineering can be divided into two parts, one part is the theoretical teaching system Section, part of which is the practical teaching system section. For the theoretical teaching of civil engineering in colleges and universities, the theoretical teaching is usually divided into four structures, starting from the mathematics series, followed by mechanics, then the study of structure courses, and finally the study of construction courses. The teaching process of the practical teaching system section starts with cultivating students' skills training, the second teaching content is structural design, and the last teaching content is to carry out a series of engineering design. Due to the influence of terrain and other aspects in different regions, the design of buildings, bridges, highways, subways and other buildings requires great professional quality and innovation ability. Therefore, colleges and universities focus on cultivating and consolidating students' professional theoretical foundation in the process of professional design. , strive to broaden the application of students in practical training, pay attention to the formation of students' quality and ability development.

2. Construction strategy of teaching system to develop students' innovative ability

2.1 Carry out practical teaching throughout the teaching

Practical teaching is a kind of teaching section that pays great attention to the process. Therefore, the process of practical teaching should run through the students' entire learning career. In the practical teaching of civil engineering, it contains many practical links, which can be mainly divided into course experiments, professional practice, professional design, project engineering training, off-campus practice, etc. In order to achieve the most effective civil engineering training goals, Improve the specifications of personnel training for civil engineering and the norms of professional skills of talents, in the process of teaching practice, to promote students' cognitive laws as the standard, to ensure the step-by-step, uninterrupted and innovative development of practical teaching in the teaching process the experimental teaching system can be divided into four major sections. The first major section is the experiment, which includes the basic experiments of daily courses, basic experiments related to majors, and professional experiments. The basic experiments related to daily courses include: Physical experiments, computer experiments, etc., professional-related basic experiments include mechanics experiments, building materials experiments, etc., while professional experiments include geotechnical testing experiments; building structure experiments and geotechnical practices. The second major section is internship. Internship includes knowledge practice, course practice, production practice and graduation practice. Knowledge practice allows students to understand the learning direction of civil engineering. Curriculum practice is to carry out corresponding professional practice for students, including measurement practice practice, production practice is to take students to the construction unit for on-site practice, and graduation practice is for the direction of graduation design. The third major section of practical teaching is design. For civil engineering students, the design is divided into two major aspects, one is curriculum design, and the other is graduation design. For its curriculum design, the content covers more, including basic design of engineering courses, the design of housing architecture courses, the design of concrete structure courses, the design of steel structure courses, etc. For graduation design, it is mainly designed by applying the content of basic courses and professional courses learned in universities, and can also inspect students. The ability to use norms and the ability to use the Internet to find information, graduation design is also a transition period for students to go from school to work. The last major section is the scientific practice section. Its content can be divided into two levels. The first level is the development of innovative experiments for students. The various characteristic innovation laboratories and innovative experimental projects for college students are platforms for students to put their innovation capabilities into practice. The second level is the development of scientific and technological competitions. Various localities and provinces will carry out various challenges for college students within a certain period of time. The 11 major contents of the four major sections in the practical teaching system are integrated into the teaching design of students in each semester, so that students can always maintain a sense of practice in the process of learning theoretical knowledge, which can effectively promote students.

2.2 Clarify the training objectives of practical teaching

For the teaching of civil engineering in colleges and universities, it is necessary to clarify the training objectives of civil engineering in practical teaching to ensure the rationality and usefulness of the training objectives. From the perspective of civil engineering, in the process of cultivating talents, a step-by-step hierarchical practice target strategy should be adopted for the cultivation of teaching practice objectives of civil engineering, and it should be divided into 4 stages. To consolidate the practical foundation in the teaching process, carry out the introduction and teaching of civil engineering professional courses for students' teaching, and conduct open experiments for students, so that students can combine inside and outside the classroom, so that students can form the most basic experimental literacy and foundation. The second level is the improvement of students' practical ability, including the opening of students' professional discipline practice, a series of comprehensive experiments and designed experiments should be set up to exercise students' practical ability and innovative experimental thinking. The proportion of comprehensive experiments and design experiments has increased to about 75%. The third level is the comprehensive application of students' innovative ability. The content of this level is based on students' innovative experiments and final semester graduation design, focusing on developing students' comprehensive ability, and integrating with provincial or national engineering design combining the competition, it focuses on developing students' comprehensive professional ability, improving students' professional level, and developing students' core innovation ability. The fourth level is to raise students' abilities again, so that students can participate in corresponding professional scientific

research, and let students participate in corresponding engineering project design, high-level project engineering practice training, etc., so as to further explore students' innovation.

2.3 Step-by-step practical teaching mode

In the practical teaching of civil engineering in colleges and universities, we should get rid of the traditional practical teaching mode and establish a new era of teaching concepts. Therefore, in the practical teaching of civil engineering, we should choose a step-by-step practical teaching mode to promote students' innovative ability. development of. Therefore, in carrying out the corresponding professional practice teaching, from the student's admission to the final graduation, it is necessary to proceed step by step, from the shallower to the deeper. First of all, the first step is to study the students' professional introduction courses, ensure that students' relevant professional skills are in place, and carry out corresponding basic experiments to exercise students' skills mastery. The courses offered include some public basic courses, corresponding basic courses. Relevant experimental courses and introductory courses related to civil engineering, the learning and experiments of these courses are the introduction and professional introduction of civil engineering practice. The second stage is the stage where students combine theory with practice, conduct civil engineering experiments in curriculum design, carry out corresponding professional curriculum design, and at the same time build a practical innovation platform for students outside the classroom to promote the development of students' comprehensive ability with boost. The third stage is to allow students to participate in the construction and design of some project projects, to be exposed to some cutting-edge research methods and scientific and technological means, so that students' learning skills can be in line with the society, and a series of civil engineering projects are listed for students in the teaching process. Cases of engineering projects, and show them the content of some engineering design projects, and make them understand the development and application of corresponding cutting-edge science and technology, so as to promote the formation and development of students' problem-solving thinking, and cultivate students' ability to solve practical problems. awareness and develop students' comprehensive innovation ability. The fourth stage is the stage of graduation practice and graduation design of professional students. In this process, the core of teaching is to focus on developing and improving students' skill application ability and engineering practice ability, so that students can have a deeper understanding of the content of this major and In-depth research to promote high-quality development of students.

3. Conclusion

With the reform and optimization of the current level of higher education, the practical teaching of civil engineering in colleges and universities should also conform to the development of the new era, and make corresponding changes and improvements. The practical teaching system of civil engineering is necessary, which can effectively improve the quality of personnel training in civil engineering and promote the innovation and development of the field of civil engineering.

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