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Exploration on Teaching Reform of Underground Engineering Construction Course in Applied Universities

Haohao Wang, Meijiao Song, Na Qiu

School of City and Architecture Engineering, Zaozhuang University, Zaozhuang 277160, Shandong

Abstract: The rapid development of transportation, energy, water conservancy and other infrastructure represented by urban underground space, especially the comprehensive development and utilization of urban underground space, makes China's underground construction projects continue to increase, and various new technologies, new materials and new methods continue to emerge, which puts forward higher requirements for underground construction. How to strengthen the cultivation of students' skills in a limited time, strengthen the cultivation of research ability, expand the knowledge of college students, and keep abreast of the latest situation of the current underground engineering development, so that students can integrate into the work faster in the future work, and better serve the engineering construction, has become the focus of teaching reform of underground engineering construction course in applied colleges and universities. Based on the analysis of the teaching characteristics of underground engineering construction course, and according to the actual situation, this paper puts forward the ideas and methods of teaching reform of underground engineering construction course.

Keywords: Application-oriented colleges and universities; Underground engineering construction; Course teaching; Reform

As an important professional basic course in applied colleges and universities, underground engineering construction course mainly studies the design and construction of underground engineering and the basic theory related to it. In order to adapt to the rapid development of urban underground space in China, higher requirements are put forward for the cultivation of underground engineering specialty. Therefore, it is necessary to reform the teaching of underground engineering specialty.

1. Present Situation of Underground Engineering Construction Course Teaching in Applied Universities

1.1 Teaching means backward

The traditional "blackboard" teaching method takes up a lot of time. Teachers use the form of "electronic courseware" more often, and the content of the teaching directly projects the knowledge from the textbook; in the classroom, the teacher talks too much, and does not give students the opportunity to discuss, think and communicate freely; these students only mechanically absorb what they learn. This kind of indoctrination method causes teachers to be very tired in the classroom, and it is difficult for students to learn, and the teaching quality cannot meet the requirements.

1.2 Class less, more content

As colleges and universities generally attach importance to the teaching of public courses and increase the practical class hours, but the number of class hours is reduced year by year, resulting in the gradual reduction of underground engineering construction class hours as a basic course, from 72 class hours to 64 class hours, until 48 and 40 class hours [1]. In addition, the underground engineering construction involves statics, kinematics, dynamics, material mechanics and other aspects, the theoretical derivation is more complicated, the concept definition is also more. It takes a lot of time and effort for students to conduct systematic research on the course.

1.3 Examination method is single

At present, the course of underground engineering construction is still mainly based on written examination, and its examination

content is mainly based on testing basic theories and basic concepts, so it is difficult to comprehensively examine students' comprehensive understanding of this course. This practice of "one examination for life" is inconsistent with the talent training plan of application majors, and the talents cultivated are difficult to meet the needs of enterprises.

2. Countermeasures for the Reform of Underground Engineering Construction Course

2.1 Reform teaching methods

Under the premise of optimizing the teaching content, it is necessary to reform the teaching methods.

(1) Use multimedia and blackboard in the classroom. In terms of teaching methods, blackboard writing teaching can be combined with multimedia teaching, adding more pictures, videos, animations, etc. to multimedia to maximize the advantages of multimedia; proper use of the blackboard can enable students to maintain good logic and coherence in the learning process. For example, when explaining self-locking, the method is to use blackboard teaching so that students can understand the detailed process of its force analysis, while when talking about sports, multimedia is used to let students watch an animation for demonstration.

(2) Reasonable use of blackboard writing to enable students to learn the knowledge of a certain degree of logic, coherence. For example, when explaining self-locking, blackboard writing is mainly used to teach, so that students can understand the specific process of force analysis, while when talking about sports, students are shown an animation through multimedia, which is not only organized, but also allows students to quickly understand the whole process.

(3) Shorten the teaching hours and increase the practice hours. In order to enable students to firmly grasp the key knowledge points, according to the needs of the underground engineering construction discipline competition, we can appropriately shorten the classroom teaching time and add some exercise classes, so as to consolidate the theoretical knowledge, which can also well meet the needs of the competition, and can also improve the students' ability to analyze and solve problems [2]. Teachers mainly learn through learning, so that students can learn about teachers' homework in time through mobile phones, and teachers can also see students' homework.

(4) Online teaching mode based on "flipped classroom" and "MOOC. MOOC and micro-class are important parts of applied undergraduate education. Using the online teaching platform, the underground engineering construction syllabus, weekly calendar, lesson plans, PPT courseware and teaching reference materials are uploaded to the teaching center to achieve the purpose of resource sharing. Using mobile phone APP, students can preview and ask questions online. Through the software, teachers can see the students' learning progress. Teachers can timely feedback students' online learning. The online teaching method of underground engineering construction effectively solves the situation of less class hours, more content, limited space, and students playing with mobile phones. Students also like the teaching method of "playing with mobile phones" very much, and the classroom atmosphere is very warm.

(5) Strengthen their own quality, grasp the scientific frontier. The quality of teaching depends to a large extent on the learning ability of teachers themselves. In the teaching process, we can not only teach basic theoretical knowledge and basic knowledge of traditional underground engineering, but also explain the latest development of various underground engineering in the fields of scientific research, design and construction, and also discuss the important technical problems and possible solutions in the field of underground engineering in the future, thus broadening students' horizons, enhancing students' interest in learning and their sense of mission to national construction, and receiving good results.

2.2 Optimization of teaching content

In view of the characteristics of underground engineering construction course content and less class hours, how to optimize the teaching content is the primary task. The construction of underground engineering involves statics, kinematics, dynamics, mechanics of materials and other aspects. It is linked to the training plan of mechanical professionals in applied majors. The content of kinematics and dynamics is appropriately reduced, and the limited class hours are arranged in statics and mechanics of materials. The experimental class hours should be increased to cultivate students' innovative spirit. The significance of experimental teaching is obvious, not only can let students consolidate the theoretical knowledge, but also can cultivate their practice and creative spirit. For example, when conducting a metal tensile test, from selecting the material and size of the sample to filling in the corresponding test data, it is up to the students to complete it themselves. In the experiment, when there are new problems, students should first be asked to analyze the causes of the problems and conduct another experiment until a satisfactory result is obtained, so that students can participate in the experiment more actively and take students as the main body of the experiment. According to the optimized teaching content, selected to statics, mechanics of materials as the focus of the textbook; according to the characteristics of the course, in the theoretical teaching, can use more examples to support, and to make appropriate adjustments to the content of the textbook, so as to make this course and other mechanical professional courses will not appear out of line. For example, in the chapter of axial tension and compression,

because the force on the oblique section of the tension (compression) rod is not the focus of teaching, and this part is more difficult, it is not easy for students to master, while in engineering practice, the oblique section of the tension (compression) rod is rare, so the class hour can be appropriately shortened [3].

2.3 Reform assessment methods

According to the characteristics of the underground engineering construction course, the closed or semi-closed method is adopted to reduce the proportion of the final examination, and the proposition is proposed in the form of multiple-choice questions, fill-in questions, calculation questions, application questions, etc., to improve the proportion of analytical and applied questions, and to focus on the examination of students' comprehensive quality. The final result consists of the usual results, the experimental operation assessment and the final examination results. The usual performance includes attendance, mid-term exams, homework, etc. In addition, the ability of students can be tested through competitions. Judging from the situation of the national college students' mechanics competition in recent years, although the students have mastered the basic knowledge, they have not "applied what they have learned" and lack the practical application and creativity. This requires teachers to carry out teaching reform in teaching, and make reasonable adjustments in teaching methods, teaching content and teaching materials.

Conclusion:

Although there are still many problems in the course of underground engineering construction in applied colleges and universities, the only way to solve this problem is to carry out continuous reform. As a college teacher, we should constantly improve our teaching level, deeply study the new teaching concept, deeply study the teaching content, assessment methods, mechanics competition and other aspects, so as to make a modest contribution to the teaching reform of underground engineering construction in our school and cultivate a modest contribution to the applied talents in our country.

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About the author:

Haohao Wang Year of Birth: 1990 Sex: Male Nationality: Han Native Place: Zaozhuang City, Shandong Province Current Work Unit: School of City and Architecture Engineering, Zaozhuang University Title: Lecturer Education: Doctoral Research Direction: Geotechnical Engineering