



The Teaching Reform of Building Structure course Based on the Training of Skilled Personnel

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Abstract. Based on the requirements of enterprises for skilled talents of architectural engineering technology major in higher vocational colleges and the teaching status of Architectural Structure course, this paper explores teaching reform by optimizing and integrating course teaching content, designing teaching methods and improving course assessment methods, aiming to improve students' learning autonomy and students' suitability for positions, and thus meet the actual needs of enterprises for talents.

Keywords: Building structure; Higher vocational teaching content; Teaching method; Examination method

1 Introduction

In 2021, the Ministry of Human Resources and Social Security issued the Implementation Plan of the "Skills China Action", proposing that the proportion of skilled talents in the employment during the "14th Five-Year Plan" period will be 30%. At the same time, the "14th Five-Year Plan" and the outline of the 2035 vision goals point out that it is necessary to strengthen the training of skilled talents, implement knowledge updating projects and skills upgrading actions, and expand the team of highly skilled talents. Therefore, in the national economic construction, the role of the status of skilled talents has gradually improved. Building Structure is an important core course for architectural engineering technology majors in junior college. By combining engineering practice, students can master the basic theories of building structures related to construction and engineering quality, not only correctly understand and apply structural design norms and related standards, but also have the ability to analyze and solve general structural problems in engineering practice. Lay a foundation for future professional work. In short, to fully grasp the current development direction and future trend of education, we should keep pace with The Times, take practical and feasible teaching reform measures, actively and steadily promote the teaching reform of "Building Structure" course, promote the teaching level of "Building Structure" course to a new level, and then help train more skilled talents to meet the needs of social and economic development.

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2 Teaching Status of "Building Structure" Course

2.1 Domestic Research Status

At present, the course of "Building Structure" meets the requirements of the professional training of architectural engineering technology, but there are still some problems in the course teaching. Problem 1: Teaching theory is not closely related to practical engineering, and traditional teaching methods are used in the course teaching process. Teachers teach theoretical knowledge in combination with the requirements of the teaching syllabus and multimedia. Teachers can introduce the knowledge points clearly, but students do not know how to solve the specific problems, nor do they know the relationship with engineering practice. Problem 2: The assessment method of the course is relatively simple, and the assessment method is to calculate the peacetime score and the final closed book exam score in a certain proportion. This assessment method can test students' familiarity with knowledge points through the final examination, but they still do not understand the application of knowledge points. At present, many domestic scholars have carried out teaching reform on the course of "Architectural Structure". Liu Yu and Sun Zhenming pointed out that in the development of the construction industry, when education reform is carried out according to objective requirements, research should be carried out first, and then focus on teaching content, teaching method reform and teaching evaluation reform, so as to fully improve students' learning experience and learning satisfaction [1]. Huang Ying and Luo Qiugun emphasized that the teaching content should be practical, the teaching practice should reflect professionalism and give play to the advantages of "dual-teacher" teachers, which changed the learning atmosphere of students and greatly stimulated the enthusiasm of students in learning and participating in social practice [7]. Fang Zhangping, Huang Wei and Gao Hongxia put forward teaching methods such as "must be sufficient" and "flow chart" in "Discussion on the Reform of Teaching Methods of" Building Structure "Based on the Cultivation of technical and Skilled Talents", and explained that the reform of teaching methods plays an important role in the success of teaching reform [2].

2.2 Foreign Research Status

In the reform of teaching idea, the teaching method of teachers' guidance and students' theme should be emphasized in scene teaching. In the teaching of foreign universities, the teaching principle of cultivating talents through theory and practice is put in the first place, and a learning model based on practical problems is formed in the classroom. Foreign universities share resources by providing rich learning and communication tools on the network teaching platform. When teachers cannot fully take into account students at different levels in classroom teaching, students can make up for the lack of knowledge through the network teaching platform. Teachers can upload curriculum-related teaching resources such as course materials, learning software, knowledge introduction, and related links for students to browse or download online for review. Students can receive learning information anytime and anywhere where the network information can be reached, and learn efficiently, realizing the real-time or non-real-time

interaction between teaching and learning, breaking through the time and space restrictions of traditional face-to-face education.

The study object of Building Structure is complex, including wood structure, reinforced concrete structure, masonry structure, steel structure and prestressed concrete structure, etc. The course content is complex and there are many formulas^[5-6]. Students may lose confidence in the whole course if they don't understand it a little in the learning process. In addition, at present, in the teaching of "Building Structure", the assessment method is single, relying solely on the final examination results to evaluate, often the characteristics of the students cultivated in this way are "emphasis on theory, light practice"; The cooperation between school and enterprise is not sufficient, and students cannot rely on the engineering examples of school-enterprise cooperation units for training in the study of this course, and what they have learned is still at the theoretical level. Therefore, after graduation, students often cannot be directly competent in the workplace or need to be trained again in the workplace, so they cannot meet the needs of enterprises, and enterprises' trust in schools declines.

3 The Exploration of Teaching Reform of "Building Structure" Course

3.1 Optimize and Integrate Course Teaching Content

According to the characteristics of the course and the analysis of learning situation, the latest teaching syllabus is revised according to the latest personnel training of the architectural engineering technology major of Shandong Huayu University of Technology. The overall requirements of the content design of this course are as follows: career-oriented -- "capable of working, able to actively adapt to changes, with innovative spirit", student-centered, creating a "learning situation at work" for students, cultivating students' independent learning and problem-solving abilities, and improving students' learning enthusiasm and sense of achievement; With the cultivation of students' ability to engage in front-line construction technology and management as the core, the curriculum system and teaching content are restructured and optimized. In accordance with the principle of "strengthening pertinence, highlighting practicality and reflecting advanced nature", the content of this course is updated from the original complex chapters into four projects: Basic principles of building structure calculation, concrete structure, masonry structure and steel structure; In each project, through the design of ideological and political teaching links to achieve each ideological and political goals, to train students to become both moral and ability, all-round development of talents; In the past, graduate students often needed a long time to continue learning and education before they could be qualified for work. In order to change this situation, the new syllabus adds 16 practical hours in addition to the 56 theoretical hours in the original syllabus, aiming to make students flexibly master and improve practical tasks in practice what they have learned in theory, and ensure that students can be directly qualified for work after work. At the same time, the amount of class hours is sufficient to ensure that

teachers can explain the theoretical knowledge clearly for students, and students do not have doubts in the learning process to ensure the learning effect of students.

3.2 Teaching Method Design

Case Teaching Method

Case teaching method refers to the teaching method that applies cases to teaching, realizes the teaching purpose through the process of organizing students' discussion and summarizing, and then improves students' theoretical level and practical ability [3]. In the teaching of this course, new knowledge is introduced through practical engineering cases, theoretical knowledge is explained and applied to the solution of practical engineering cases, in-class practice enables students to solve practical problems, and strengthens the combination of theoretical teaching and practical teaching [4], so that students can truly understand this course and realize the importance of learning "Architectural Structure" well.

Group Discussion

The content of this course is more difficult than that of other professional courses, so students often encounter many problems in the teaching process, self-study and practical tasks. The group discussion method is of great help to solve the problems. First of all, in the teaching process, teachers can deepen the impression of the learned theoretical knowledge through discussion after teaching theoretical knowledge, so as to ensure that students can internalize theoretical knowledge. Secondly, students' ability of cooperation can be cultivated in completing practical tasks.

Task-Driven Approach

This course focuses on the cultivation of students' ability. 16 practical hours are arranged in the total class hours. Through the completion of practical projects, students can understand the mechanical properties, calculation methods and reinforcement structure knowledge of various reinforced concrete components, cultivate students' self-learning quality, and have the ability to select and design concrete structural components.

Multimedia Presentation Method

In teaching, teachers collect relevant videos and animations to demonstrate the real process of stress changes. For example, when explaining the failure characteristics of the normal section of bending members, students find it difficult to understand when introducing theoretical knowledge. Multimedia is used to demonstrate three morphological changes of the failure of the normal section of beams to students. Through the multimedia demonstration method, the theoretical knowledge of the failure and change process of super-reinforced beams, properly reinforced beams and less reinforced beams in the book can be concreted, and the students will have a better grasp of the failure characteristics of various sections, so they can understand why only the properly

reinforced section can be used in the design of reinforced concrete flexural members in real practical projects.

3.3 Course Assessment Methods

Emphasize Process Assessment

The curriculum reform of "Building Structure" based on the training of skilled personnel emphasizes the training of ability and the light of theoretical knowledge in the teaching process.

The emphasis is no longer just on imparting theoretical knowledge, but more attention is paid to the cultivation of students' practical ability and comprehensive quality. In this teaching reform, corresponding reforms have been carried out in teaching content, teaching methods and assessment methods to adapt to the new teaching objectives, and then achieve the effect of learning to practice, and cultivate more skilled construction engineering technical talents to meet the needs of social development.

Diversified Assessment Methods

Teachers evaluate students' learning of online resources, classroom explanations and homework completion through the Learnconnect network platform, evaluate students' mutual evaluation among student groups, and conduct comprehensive evaluation through the final test.

In the original outline, the usual score accounted for 30% of the total score, which was composed of attendance, class practice and class performance; The proportion of normal grades in the new revised outline has not changed, and the specific composition is changed to (online) resource learning, in-class practice, homework and periodic tests. For example: (online) teaching resource learning assessment rules are specific to the main examination of whether students can complete the online resource teaching task assigned by the teacher on time before class, the completion effect, accounting for 20% of the usual score; The assessment rules of in-class practice are based on the comprehensive assessment of students' completion of practical tasks in class, accounting for 30% of the usual grade.

The change of the syllabus stems from the nature of the course "Building Structure". Students' shortcomings in classroom learning can be learned through online resources, and they can master and be familiar with basic theoretical knowledge through daily intensive exercises. Besides, they should be able to complete specific practical tasks, so as to exercise students' independent learning quality and cultivate their ability to select and design concrete structural components. In the future, after going to work, you can be directly competent for work and become the technical talents that enterprises really need.

4 Conclusion

"Building Structure" is a compulsory course for the architectural engineering technology major of higher vocational colleges, which belongs to the core course of the major and has a higher credit. In order to ensure that the students of architectural engineering technology major can meet the requirements of the training of skilled talents in the 14th Five-Year Plan and the outline of the 2035 vision goal, the reform is carried out in three aspects: optimizing and integrating course teaching content, designing teaching methods and improving course assessment methods. Through the curriculum reform, students' learning autonomy is improved, students' cooperation ability is improved, and they can solve the practical engineering problems of relevant courses, so as to cultivate skilled talents suitable for enterprises for social development.

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