Discussion on Teaching Methods of PKPM Course

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Abstract. With the application of PKPM in the construction industry, aiming at the current lack of teaching status, this paper analyzes some problems in the teaching of PKPM in building structure, and carries out the teaching research on the teaching content, teaching methods, teaching mode and assessment methods.

1. Introduction
With the development of science and technology, structural analysis theory and computer hardware technology are constantly developing and perfecting. Computer-aided design systems are more and more widely used in the field of architectural engineering design. At present, the widely used structural calculation software in China is the PKPM series software developed by China Academy of Building Research. This software has become the basic skill that structural designers must correctly master proficiency applications. Based on this, it is widely established as a professional foundation course in the construction engineering major of colleges. This course is a practical and professional course. Based on the structural design, and it teaches the basic operation of PKPM software and its application in structural construction drawings. This course not only enables students to master the basic operation of the software, but also have a new understanding and improvement of the application of the basic theoretical knowledge of the previous majors. This course not only enables students to master the basic operation of the software, but also have a new understanding and improvement of the application of the basic theoretical knowledge of the previous majors, aiming at cultivating students' basic ability to use software for structural design, and ability to comprehensively analyze various complex factors and solve practical engineering problems[1].

2. Problems and Deficiencies

Building Structure Design Software Application is a compulsory course for architectural engineering technology and a professional skill course. At present, all major universities have already opened this course, and have carried out corresponding discussions and research[2-4].

The author finds in the teaching and research that the current teaching status is not satisfactory. First of all, the textbooks, cases, etc. of the course are not as applicable as traditional courses such as concrete structures, and the teaching content is outdated. Secondly, the teaching method is not scientific. The teaching only stays at the primary level of the basic command, which is not deep enough, so that the design content that the students can master in the course is very small, so that the software can not be used to deal with the practical problems in the design flexibly. In addition, the examination form is single and the assessment is not comprehensive. The traditional assessment method is a written test plus a machine test, or even a written test. Due to the limitation of the examination time, the general problem is relatively simple. It is only about the application of basic operational commands. Although it can reflect the initial learning of the students to a certain extent, it
does not reflect the students' true design ideas. Therefore, it is necessary to carry out certain research and reform on the PKPM course, and explore an effective teaching method to make students truly learn to use[1].

3. Methods and Measures

3.1. Teaching content
PKPM is a comprehensive CAD system for large-scale construction projects with many modules. The teaching content needs to be selected according to the profession and teaching hours. For the construction engineering profession, it mainly includes five major modules: Structural Plane Computer Aided Design (PMCAD), Frame computer aided design (PK), Structural space finite element analysis design software (SATWE), Foundation Engineering Computer Aided Design (JCCAD), Concrete structure construction drawing. In this course, more colleges generally arrange 32 teaching hours, and the allocation of teaching hours is shown in Figure 1. At present, the existing textbooks are outdated and do not meet the requirements of the talent training objectives. Therefore, it is necessary to collect the pingfa atlas, drawings and specifications related to the curriculum teaching, and carry out research on self-edited teaching materials for the course.

3.2. Teaching methods
In the teaching method, the "project teaching method" is adopted. It is a teaching activity through a complete engineering project, integrating the operation of commands and software into specific project examples, rather than simply explaining commands and operations[5], the basic process is as shown in Figure 2. The selection of the project is the key to success. The selection of the project should be based on the teaching content. For one thing, we must fully consider the theoretical knowledge needed to complete the project. For another hand, we must consider the feasibility of the project. It is not appropriate to deviate too much from the actual project. The selection of the project should be based on local engineering examples, on the one hand to enhance students' interest, and on the other hand to enhance students' understanding of the local characteristics and architecture.
3.3. Teaching mode

The course is generally held in the last semester of the senior year. The knowledge involved in the teaching process is very wide. Therefore, in the teaching mode, the advantages of the traditional teaching mode and the multimedia teaching mode should be combined to make a comprehensive consideration of assignment theory and operational time. With rational allocation of theory and operation time, the theory teaching is arranged in the classroom, the operation teaching is arranged in the computer room, the theoretical teaching is completed after the operation, or the theory and the machine interspersed teaching to improve the learning efficiency. The key to this teaching model is the rational allocation of theory and operational time, Figure 3 below shows the proposed theoretical time.

3.4. Assessment method

Due to its practical teaching, the traditional written test method shows many drawbacks. It cannot evaluate the students' learning situation well, and it also deviates from the training goal of this course. The author believes that a combination of written test, machine test and stage assessment should be adopted, and machine test should be used as the main means to test the teaching effect[6]. The written test mainly examines students' mastery of basic theories and norms; the machine test mainly examines students' proficiency in software and basic operational skills; the stage assessment includes three parts: model initial construction, model optimization, and structural construction drawing. In addition, the form of the multimedia courseware can be used, and the students can explain the results of their own design one by one, and other students question and question. The basic assessment method flow is shown in Figure 4.

3.5. Application method

Past teaching experience shows that learning the biggest enemy of PKPM is forgetting, so you need to learn what you have learned, and you can truly master this skill through continuous use. First of all, the college can hold a PKPM structural design competition every year; Secondly, actively participate in structural design competitions within and outside the province, such as the province, the Central South region and the national structural design competition; In addition, the PKPM software is applied to the graduation design. The students first calculate the representative frame of the structure and the basement design, and then use PKPM software to calculate the whole building structure.
4. Conclusion
For the teaching and learning of the highly operational PKPM course, rationally select the teaching content, select appropriate project examples, adopt the traditional and multimedia combination teaching mode, use the comprehensive examination and assessment methods, strengthen the cultivation of practical ability, and truly stimulate the enthusiasm and initiative of the students to learn to use the basic skills of computer design, this is the ultimate goal of our teaching.

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