

Practice of BOPPPS Teaching Method Based on Case Base Construction in Course of Architectural engineering drawing and drawing recognition course

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Abstract. Under the influence of vigorous development of information technology, the teaching mode and means also have new auxiliary measures and implementation ways. Considering the students source characteristics of civil engineering majors in private colleges and universities, the BOPPPS teaching method is introduced in the course of teaching reform of drawing and mapping course, and the implementation method of network case base is adopted by both teachers and students in order to improve the students'interest in learning and achieve the teaching purpose.

Keywords: BOPPPS teaching method; case base; private colleges and Universities.

1. Introduction

The course Architectural Engineering Drawing and Mapping is a basic course for civil engineering undergraduate majors. This course supports students to master basic skills of building engineering drawing and Mapping in the training of civil engineering professionals. The course content is based on the relevant national standards for drawing and the basic method of descriptive geometry theory. Finally, students are trained to master scientific thinking methods and to enhance engineering awareness and exercise independent working ability. However, the quality of students in private colleges and universities is not balanced, and with the compression of teaching hours, classroom teaching needs to be designed more effectively. This paper discusses the current teaching situation, course positioning and selection of teaching methods, specific implementation strategies, and analysis of Ideological and political effects of the course.

2. Current situation of teaching

2.1 Significant biogenic characteristics

The students of private undergraduate colleges and universities generally have the characteristics of weak mechanical foundation and poor self-learning ability. Specifically manifested as being highly skilled and inexperienced in simple problems in the learning process, being lazy in hands-on exercises, and having low academic requirements for themselves. With the increase of course difficulty, they have no spirit to study difficult problems and cannot complete the systematic learning of the whole course. Most of these students are only children with good family conditions, low learning pressure, distinctive personality, active thinking, good overall quality and are willing to spend time on things they are interested in, but they often have poor pressure resistance, unclear learning objectives and poor awareness of discipline. This requires the instructors to guide the beginning of the course and design the course, at the same time, pay attention to using various teaching methods to improve students 'learning motivation.

2.2 Limited teaching hours

With the deepening reform of Application-oriented Undergraduate Colleges and universities, the time setting of each professional course has been reduced to a certain extent. The course of Architectural Engineering Drawing and Mapping includes two main teaching contents, namely, basic principles of descriptive geometry and construction engineering drawing, which involve more basic

drawing rules. Since it is the first professional course for students since their entrance, the content of the course is more abstract and students are required to have comprehensive practical application ability, which increases the difficulty of theoretical teaching. If professional teachers want to complete the teaching content specified in the syllabus, they need to make full use of the teaching time in the classroom, which will lead to the phenomenon of "full classroom teaching". It is not advantageous to achieve the anticipated teaching objectives and effects.

2.3 Old Teaching Arrangements

The course is basically taught in chapters. The way of teaching theoretical knowledge is generally to teach theoretical knowledge + examples in the classroom. The class atmosphere is rather dull. Because of the compressed class hours and insufficient classroom interaction, students lose interest in the classroom, so the teaching effect cannot be achieved.

2.4 Unclear assessment criteria

The examination mode of final examination + attendance + classroom performance can only roughly reflect the degree of students'effort to the course and their mastery of basic concepts and theories, while the achievement of training objectives for applied undergraduate talents cannot be reflected.

3. Course positioning and selection of teaching methods

In order to carry out the reform of Architectural Engineering Drawing and Mapping, we must first determine what basic concepts, theories, general skills and professional skills students need to master and the necessity of these teaching objectives through learning.

The employment orientation of undergraduates majoring in civil engineering is mostly technicians and constructors of construction units. After graduation, the graduates are faced with complicated employment environment and hard-working conditions. At the same time, the graduates are required to have sufficient theoretical knowledge and technical ability. Therefore, in the process of talent cultivation, we must adhere to the cultivation concept of "Integration of knowledge and practice, and integration of engineering and learning", so as to cultivate "civil engineering talents" who understand design, refine technology and can manage. "Club management means that students can organize the construction of general projects, i.e. understand the construction process, carry out the layout of the construction site and arrange the construction reasonably, and have good communication and cooperation ability." Precision technology refers to that students are familiar with construction drawings, atlas and related specifications, and can solve various common technical problems in the construction process. Understanding design means that students can design the basic components so that they can deal with the strain on the construction site. Therefore, the teaching objective of this course is to enable students to master the building drawing specifications, have good ability to read and read maps, be familiar with the relevant atlas, specifications and be able to use them, at the same time, cultivate students 'team awareness, communication and cooperation ability and the ability to analyze and solve problems.

As a teacher, we need to know clearly what kind of teaching design can effectively help students achieve these teaching results, how to determine that students have acquired relevant knowledge and skills, and how to ensure the adequacy of teaching objectives.

Due to the practical nature of the course, in order to enable students to concentrate, master basic theories and concepts, and improve their professional and general skills. In the course of classroom teaching organization, BOPPPS teaching mode is mainly used in the learning stage of projection theory and drawing criteria knowledge. BOPPPS teaching mode is also called effective teaching mode. That is, its teaching mode is characterized by clear objectives, clear teaching links and strong flexibility. Its teaching links are divided into six stages: introduction, clear objectives, pre-test, participatory learning, post-test and summary. In the practical stage of construction drawing reading

and drawing project, according to the teaching concept of "Four Truths and Three Modernizations", the project-based group task is adopted so that students can master the reading of construction drawings of various types of buildings in a limited class time.

4. Specific Implementation Strategies

In the learning stage of projection theory and drawing criteria knowledge, BOPPPS teaching method is adopted, three-dimensional model of relevant building parts is established by using network platform, case base is formed, and projection theory and drawing basis are explained by using BOPPPS teaching method. During the construction drawing drawing drawing stage, real engineering construction drawing is introduced, project-based group task is adopted, and students are allowed to learn basic knowledge, put forward problems, analyze problems and apply them according to their project group cases, so as to draw three views of the case, and then summarize and report the basic knowledge. At the stage of construction drawing recognition, competition is adopted to complete the copying and reading of construction drawings.

4.1 Case Base Construction

Taking the construction drawings of simple components and parts as research objects, the basic ability is developed around the drawing reading method and the drawing reading process to form the project case base of the course.

With the development of information technology, higher requirements are put forward for the informatization construction of course resources. In the drawing course, the method of three-dimensional display by software is also more used in the teaching. Modeling software can be used in the process of teaching to build the course-related virtual model library and be applied in the classroom teaching of Architectural Engineering Drawing and Mapping. Three-dimensional modeling builds a soft-built virtual model, which can be used not only to show the three-dimensional shape of a combination or a building part, but also to cut or draw two-dimensional drawings by using relevant software, thus realizing the flexible transformation between two-dimensional drawings and three-dimensional models. Such a case base can facilitate the teaching arrangement and the learning of students is not limited by time and space. The modern information technology teaching method is more in line with the learning habits of modern students, and can better display the basic theoretical knowledge of descriptive geometry, laying a solid foundation for the follow-up course learning.

In the process of model establishment, the commonly used software is Revit, CAD, Guanglianda, Luban series software, etc. In this paper, Revit is mainly used to construct the virtual model library of the course Architectural Engineering Drawing and Mapping. In the software, the model is built by volume, family, etc., and the basic entity model is drawn by stretching, mirror, rotation and other functions when it is created. Through parameter setting, the virtual model which can change the parameters is formed. After loading the building template, the model can be sectioned and the screenshots of related views, such as sectional view and axonometric view, etc. In this way, the cases in the textbook can be built into a three-dimensional model library, which is convenient for students to learn after class. When the case changes in the used textbook, we can use the original case to let the students learn after class. Meanwhile, we can select the students who are interested in the modeling software to guide them and help them update the case base.

When completing the design task, the main work of students is to acquire task, form design team, match ability in the process of forming project team, arrange design task according to the knowledge level of students, and realize difficult to match; Consult and collect relevant drawing standards and specifications for drawing construction drawings; Summary, group members review each other, group review each other. And the main work of teachers is: assignment; Teaching basic theoretical knowledge; Assist students in drawing; Comprehensive assessment of project completion and student performance. During the course, first of all, combining with actual engineering projects, students have a basic understanding of building construction drawings, and mainly teach basic drawing

specifications and standards in class. This part can also use the mode of flipping class. Select students who are familiar with the drawing set specifications to give instructions under the guidance of teachers as an additional part for students. Establishing discussion groups after class helps most students improve their knowledge and skills. At the same time, the whole process of teaching is combined with real engineering, which increases the practicability of the project and promotes students' interest in learning.

4.2 Application Practice of BOPPPS Teaching Method

Introduce real engineering cases, train students to master scientific thinking methods, enhance engineering awareness and exercise independent work ability.

Project-based group tasks are used for the interpretation and mapping of construction drawings during project implementation. In the construction drawing, the drawing of building plan is very important. This part takes the drawing of building plan as an example to carry out teaching design.

Before learning building plan drawing, students already have the basic knowledge of descriptive geometry and the basic principle of section drawing. During the course, the teacher first guides the students to review the relevant knowledge of section drawing and lets them observe its characteristics carefully. Then, the students are shown the formation of building plan using animation simulation to observe its characteristics carefully. Guide the students to summarize which components are cut into and which structures are seen on the building plan.

Teachers clarify the learning objectives of the course to students and emphasize the key and difficult points.

Teachers give students a pre-prepared quiz on building plan drawing through a cloud class. The content includes the basic principles and methods of building plan drawing and knowledge of content to be expressed. According to the test results, students understand their knowledge of the preliminary stage, so as to facilitate the follow-up focused listening; Teachers check the overall test of class students through the statistical results of the test, eliminate the students and adjust the teaching activities in time.

During the course, during the orientation phase, students are asked to discuss the components cut on the building plan and the visible building components as a project group, and to determine what else needs to be specified on the building construction plan. In the teaching section of drawing standards, let students find out the wrong parts in the wrong cases and correct them, so as to improve students' classroom participation and knowledge practicality, and increase students' interest in learning.

At the end of the course, the instructor issues pre-set test questions to students through the cloud class. Through the test, students can get timely feedback on their learning efficiency, and teachers can also grasp the learning situation of students in time.

4.3 Course Assessment Criteria

The assessment of this course is divided into two parts: process assessment and final examination. The process assessment results account for 60% of the total. The main contents include attendance, classroom performance, major assignments, project tasks, etc. During the assessment, the assessment points should be detailed and the assessment methods varied. The final paper score accounts for 40%, which mainly checks the students' mastery of basic knowledge and theory by means of closed-book test.

Through the course reform, the students are expected to complete the classroom teaching process so that they can actively learn the norms and atlas, and actively learn the reading of structural construction drawings. They have good ability to read and recognize the relevant atlas, norms and can use them. At the same time, they can use the project-based group task teaching mode to cultivate the students' team awareness. Ability to communicate and collaborate as well as to analyze and solve problems.

4.4 Competition to promote learning and strengthen the scientific research and practical ability of teachers to lead students to master core skills

In the process of teaching, teachers can be encouraged to lead students to actively participate in various disciplines contests which are at the forefront of the course, such as BIM Modeling Contest, Drawing Competition, etc. At the same time, students are encouraged to participate in relevant scientific research projects of teachers, innovative entrepreneurship contest and various practical practice activities. For the teachers in charge, they need to know more about the frontier of the discipline, actively participate in relevant continuing education and training, constantly improve the self-knowledge structure system, improve their own quality, and do a good job in scientific research and teaching accumulation.

5. The practice of ideological and political reform in teaching

The ideological and political reform of the course of architectural engineering drawing and map reading is to infiltrate the elements of Ideological and Political Education under the original knowledge system and teaching system. Transfer positive energy, improve students' interest in drawing learning, so as to improve students' ability to read and draw parts drawings, cultivate students' serious and responsible attitude and rigorous and meticulous style, deepen students' awareness that drawing and reading drawings must follow norms, and integrate the connotation of "craftsmanship spirit" into the course.

During the course of teaching, take the course content as the carrier to carry out the course Ideological and political work. In the introduction, add Mr. Lin Huiyin's typical stories to discuss the significance of engineering drawing with students, so that students can understand the connotation of craftsman spirit in the process of discussing and searching materials. In the learning stage of construction drawings, guide students to treat atlas and norms correctly, cultivate students 'engineering thinking by interpreting and learning the norms, and establish students' respect for the norms and standards. Meanwhile, strengthen students 'awareness of norms by adding "error correction" into the teaching link; In terms of model expression, that focus on the development of information technology to guide students to learn new means of drawing and modeling. In the course of teaching, the display of assembly building parts model and the basic introduction of building information model are added to enhance students 'interest in learning and lay a foundation for the following courses.

6. Summary

BOPPPS teaching method provides a clear and efficient design mode for the course of engineering drawing of civil engineering specialty. Combining with the construction of case base, it can effectively solve the problems in the course of teaching. However, we must also be aware of the overall role of teachers in the BOPPPS teaching model. Teachers need to timely adjust the course design and guide students to think according to the feedback of students 'learning situation. This requires the teachers to improve their own observation, have solid basic teaching skills and the ability to control the overall situation.

For ideological and political part of the course, we need to fully play the role of classroom teaching, adopt appropriate teaching methods and arrangements, penetrate craftsman spirit and engineering thinking, at the same time, combine after-class work, take work and testing as the carrier, and strengthen one of the core values of students' society. In order to achieve the effect of Ideological and political education, it is necessary to set appropriate assessment methods in the process assessment link and the end assessment link.

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