

Teaching Design of Test and Detection of Civil Engineering Materials in Higher Vocational Education Based on Task-Driven Teaching Method

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Abstract: with the expansion of higher vocational education, various teaching methods have been continuously applied in the classroom. Civil engineering materials testing and testing is a more practical course. There is a weak cultural foundation and learning for higher vocational students. Characteristics such as lack of initiative, how to improve students' professional ability, and improve students' learning enthusiasm. This paper proposes a teaching design of higher vocational civil engineering materials test and detection based on task-driven teaching method.

1. Introduction

With the rapid development of information technology, students can acquire the required knowledge through different information platforms. The learning characteristics and personality characteristics of higher vocational students make traditional teaching methods no longer suitable for modern teaching. In the teaching of civil engineering materials testing and testing courses, the objective is to improve professional ability and comprehensive quality. Explore and try a variety of teaching methods. The task-driven teaching method is more suitable for this more practical teaching course, focusing on the training of the ability required for the post, and creating more conditions for the future development of students.

2. Task-Driven Teaching Methods Related Concepts

2.1 Concept

The task-driven teaching method can provide students with a situation of experiencing practice and a situation of perception problems. Learning is carried out around tasks. The completion of tasks is used to test and summarize the learning process to change the learning state of students and enable students to actively construct inquiry, practice and thinking problem-solving learning system. It is a teaching method based on constructivist learning theory. It transforms the traditional teaching concept that was mainly based on imparting knowledge into a multi-dimensional interactive teaching concept that focuses on problem solving and task completion. Transformed into inquiry learning, making students in a state of active learning, each student can put forward solutions and solve problems based on their own understanding of current problems, using common knowledge and their own unique experience. Generally speaking, task-driven pedagogy has its four steps. First, the teacher creates a learning environment that is as realistic as possible related to the learning theme of the student, and guides the learner into the learning situation with real "tasks" to make learning more intuitive and visual. Secondly, in the created situation, authentic events or problems (tasks) closely related to the learning theme are selected as the central content of the study, so that students face a realistic problem that needs to be solved immediately. Teachers then provide the students with relevant clues to solve the problem, such as what kind of materials need to be collected and where to obtain relevant information. Emphasize the development of students' "autonomous learning" ability. At the same time, it advocates discussions and exchanges between students, supplements, revises and deepens each student's solutions to current problems through the

confrontation of different perspectives. Finally, the effect of student learning is evaluated, including not only the process and results of students completing the current problem solution, but also the student's ability to learn autonomously and collaboratively. This method is widely used in the teaching process of higher vocational education. It can simulate the practical environment, improve the vocational skills of higher vocational students, and meet the teaching needs of vocational colleges to cultivate high-quality technical and skilled personnel [1].

2.2 Implementation Principles of Task-Driven Teaching

2.2.1 Step-by-Step Principle

Task-driven teaching method is different from the traditional teaching mode. There are major requirements for teachers' teaching ability, number of students, teaching resources and hardware equipment of colleges. In the implementation process, we should promote the development of task-driven teaching methods step by step. Enable teachers to use in the classroom, so that students gradually become familiar and adapt [2]. In this process, universities need to optimize their teaching resources, improve the quality of teachers' dual teachers, and improve the construction of training equipment and training rooms in teaching. Strongly support the implementation of the teaching method, supporting the establishment of corresponding rules and regulations, and ensure that teachers are fully devoted to the use of the teaching method.

2.2.2 Principles of Textbooks First

When using the task teaching method, pay attention to the corresponding situation design, with the premise of practical conditions, the content of textbooks as the basis, and students as the main body. Let students learn while doing, and master basic theories on the basis of mastering skills. Textbooks are the carrier of student learning, and also an important factor affecting the teaching quality of higher vocational colleges. It is especially important for students to choose appropriate textbooks or to write textbooks that meet the characteristics of higher vocational education. Good teaching materials can make it easy for students to master the completion of practical tasks in task-driven teaching methods, and also to understand the theoretical knowledge of relevant technical properties, so that students no longer struggle with rote memorization of related narrative content.

2.2.3 Principles of Teaching Compatibility

Generally speaking, there are many knowledge points involved in the test and detection of civil engineering materials, and some test operations are also more complicated. Therefore, teachers should take students as the main body when teaching. Let students discover and summarize problems in this learning process, and discuss with teachers to achieve common progress and common development of teachers and students. When students complete tasks, some students may get some inspiration and inspiration in the operation process, and then get breakthroughs and innovations. This will also cause "naive" problems. Teachers must deal with this situation correctly. It cannot stifle the students' innovative thoughts and consciousness of inquiry, and can learn together with the students to achieve the purpose of teaching.

3. Problems in Teaching and Testing of Civil Engineering Materials in Modern Higher Vocational Education

3.1 Students' Ability to Process Test Data Needs to Be Improved

The course of Civil Engineering Materials Testing and Inspection mainly explains the technical performance and testing methods of materials such as cement, sand, ordinary concrete, building mortar, asphalt, steel, inorganic binder stabilizing materials and asphalt mixtures; students can learn about ordinary concrete after studying, Mix design of building mortar, cement (lime) stabilized soil, asphalt mixture and quality evaluation of various materials. This course is very practical. Most students like to take practical training courses, but there is a phenomenon of "taking pictures of cats and tigers" or "knowing why they do not know why" about how to deal with the data after the

experiment.

3.2 Students' Enthusiasm for Learning Needs to Be Stimulated

With the development and scale of higher vocational education, the level of students is uneven, most students have weak cultural foundation courses, and lack good study habits, and have a lot of knowledge and a wide range of subjects. If the teacher does not pay attention to the student's learning dynamics and classroom participation in the classroom, and only teaches unilateral knowledge to students, the students will be in a state of passively receiving knowledge. Over time, students have an unpleasant and boring bad learning psychology towards the course, and they have slept extensively in class.

3.3 Teaching Content Does Not Meet the Needs of Students' Employment Direction

Civil engineering material testing and testing is a professional basic course for civil engineering majors in higher vocational colleges, and is also a core course for students majoring in civil engineering testing technology. The effect and quality of student learning have a direct impact on their subsequent professional courses or job-testers [5]. The content of this course includes the composition of materials, technical performance and its detection methods, characteristics, applications, storage requirements, etc. Due to the constraints of college training conditions and the level of teachers, some colleges emphasize theoretical explanations and light practice trainings in the teaching process. Operation, resulting in students unable to quickly adapt to job requirements after employment.

4. Teaching Design of Test and Detection of Civil Engineering Materials in Higher Vocational Education Based on Task-Driven Teaching Method

4.1 Design Basis

The key step of task-driven teaching method is to design corresponding learning tasks. In the task design, the employment position of the student tester should be considered, and the teaching design should be based on the student's learning ability and learning characteristics. In the course of teaching, the emphasis is on cultivating students' ability to select materials and carry out tests. According to the theoretical teaching content in the textbook, it should be appropriately deleted or used as an extended knowledge for the students to make an understanding study and use the saved time in the students' experimental operations. Continuously strengthen students' practical skills and improve their comprehensive ability [6].

4.2 Design Steps

The design consists of three steps. The first step guides the students to preview, the second step uses the task-driven method to allow students to study in groups, and the third step evaluates the students' learning.

4.2.1 Guide Students to Preview

Before the teacher teaches the class, he or she prepares the students for preview. Higher vocational courses focus on training students' operational skills. The general theory and practice ratio of class time distribution is 1: 1. The theoretical explanation is greatly reduced, but it does not mean that students are only trained for skills, but that it also highlights the skills of technical personnel. "Technological" characteristics, so for the study of some theoretical knowledge, you can use information technology to use mobile phones such as cloud classroom software to publish leading questions for students, so that students can learn and think with questions with curiosity. For example, studying the volume stability of cement, students are asked "What is volume stability?", "What are the dangers of volume stability?", "What can cause volume stability problems?", "How to detect the volume stability of cement?" Sexual problems? "And other questions can enable students to study with interest, and then understand the significance and importance of testing.

4.2.2 Use Tasks to Drive Students to Learn in Groups

The course of Civil Engineering Materials Testing and Inspection is a highly practical course. The proportion of experimental class hours is more than one third. In the task-driven classroom, the test operation mainly adopts group learning. Divide students into 6-8 groups with 5-7 people in each group, and complete the corresponding tasks in groups. When grouping, you should consider each student's strengths and the relationship between classmates to make a reasonable group. In this way, group learning can better complete tasks and achieve good results. At the same time, a suitable group leader should be selected in the group, and it is required to have a certain organizational ability and learning ability. That is to be able to reasonably assign tasks to everyone, coordinate and organize everyone to work together to successfully complete learning tasks. For example, in concrete test teaching, for each test item of concrete, through group cooperation, consultation and discussion to develop test plans, group test preparation, students complete the entire test process independently, then perform data processing, fill in test reports, and finally the teacher according to Comment on the completion of the group, develop students' social ability of teamwork, self-learning methodologies, and professional capabilities that seamlessly integrate with the job.

4.2.3 Teaching Evaluation

Teaching evaluation is an important link in the teaching process and has a direct guiding role for students' learning. With the rapid development of information technology, a variety of assessment models for students are increasingly adopted by everyone. Only when teachers evaluate it scientifically, reasonably, and fairly, can students' enthusiasm for learning be promoted. In group learning, students complete their learning tasks before, during, and after class. Teachers make use of mobile classroom assistant software, such as cloud classrooms, to manage feedback information throughout the process to make student performance assessments public. Student's self-study before the class, teachers initiate discussions, brainstorming and other interactions during the class, and after-class results are displayed. Teachers can obtain intuitive data through the platform to quantify the student's assessment and avoid the subjective nature of the teacher's assessment of the students. , Reflects the authenticity of student learning, and enhances the initiative and enthusiasm of students.

5. Effectiveness of Task-Driven Teaching

5.1 Improve Students' Ability to Analyse and Solve Problems

The task-driven teaching method adopts the group to formulate plans and complete tasks in the implementation process, "taking tasks as the main line, teachers as the lead, and students as the main body", which has changed the past "teachers talk, students listen", and the passiveness of teaching. The teaching mode has created a new learning mode based on learning and teaching, students' active participation, autonomous collaboration, and exploration and innovation. Students' ability to analyse and solve problems has been improved, and classroom efficiency has been significantly improved.

5.2 Has a Positive Effect on Students' Professional Ability Development

The task-driven teaching method is mainly based on the teaching development requirements and the professional needs of vocational students. Students especially in the practice study, watch the test video, complete the test flow chart and test plan before class, the teacher emphasizes the safety precautions of the instrument in the classroom, complete the test operation in groups and record the video, and finally carry out the "6S" finishing The laboratory, in which recorded videos are edited, and teachers play reviews in the classroom, allowing students to identify problems, make students realize the standardization and rigor of experimental operations, improve students' professional quality, and shorten their graduation Seamless docking with jobs.

6. Conclusion

Guided by the task-based approach, students show positive learning in the classroom. Find and solve problems during teamwork to complete tasks. Instead of studying civil engineering material testing and testing as a course, learn it as a challenge or struggle. This greatly enhances the students' initiative in learning and prevents them from appearing lazy in the classroom or playing mobile phones in class. Under this mode, students can also learn more professional knowledge and practical skills, and in the process of group cooperation to complete the task, they have improved their comprehensive qualities such as problem analysis, problem solving, and solidarity.

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