

## Research on Teaching Reform of "Electrical Technology" for Cultivating Applied Talents

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**Abstract:** This paper focuses on the "Electrical Technology" course offered by the non-electrical majors in higher vocational colleges. The paper first analyzes the teaching status of the course, and then proposes a combination of theory and practice based on the work process based on the problems in the classroom teaching. The teaching method suggests that the specific work tasks can be divided into five stages and the teaching evaluation system is designed.

### 1. Introduction

"Electrical Technology" is a compulsory basic course for non-electricity majors in higher vocational colleges. Through the study of this course, students master the general methods of circuit analysis, the analysis of AC circuits, the basic principles of electric motors, and the related knowledge of power supply and power safety, and master the use of commonly used instruments for electrical measurement. This course lays a good theoretical foundation and practical foundation for students to follow professional courses and engage in relevant engineering and technical work.

### 2. Status Quo of Traditional Teaching

The disadvantages of the traditional teaching model

The "Electrical Engineering" course is theoretically strong and it is relatively difficult for students to learn knowledge. The traditional teaching model is teacher-centered. The content taught by the teacher places too much emphasis on the "tiling" knowledge point of the teaching material. This makes the task of the teacher merely imparting knowledge, and the students' knowledge points and specific applications cannot be linked and cannot be satisfied. The course analyzes the teaching objectives of problems and problem solving skills.

Excessive pursuit of systematic content and integrity in teaching content

"Electrical Technology" is a basic course for non-electricity majors in higher vocational colleges. The curriculum covers a wide range of topics, but different professions have different focuses on the requirements of the "Electrical Technology" curriculum. Because the traditional teaching is mainly based on teaching materials, the systematicness and completeness of the teaching contents are excessively pursued in the course of teaching to make students current. The knowledge point is only in the understanding stage and cannot be linked with the actual application.

Theoretical teaching and practical teaching are independent and cannot be unified organically

The "Electrical Technology" course is a theoretical and practical professional basic course. The current teaching mode is the separation of theoretical teaching and practical teaching, and cannot be unified organically. Some of the majors are limited by the academic hours, and there are fewer experimental courses, or the experimental content is mainly for the verification practice, which is insufficient to cultivate students' innovative ability, and to understand the specific role and application of the course in the subject. How to improve learning interest in learning, make students' learning status become passive and active, and the ability to train students to analyze problems and solve problems is currently a problem that needs to be solved.

### 3. Implementation of Teaching Reform

Change the traditional teaching model with teachers as the main body, give full play to the students' active initiative in the classroom, make the teachers become dominant, and become teacher-led classrooms, embodying the student's dominant position in the classroom.

#### 3.1 Determine teaching content

According to different professional training programs and the curriculum standards of the course, the teaching objectives of the "Electrical Engineering" course are the application of the principle of application, the selection of content, emphasizing the basic concepts, focusing on the application without focusing on formula derivation and Theoretical certification. The integration and optimization of the course content also needs to analyze the relationship between the professional teacher's position in the subject and the follow-up course in order to determine the teaching content.

Different professions need to analyze the talent training program and job requirements to determine the teaching content. The teaching content of the "Electrical Engineering" course can be divided into four major projects. For each project, different specific tasks can be designed to learn. The tasks for each item are shown in Table 1.

Table 1 Task Decomposition of Electrotechnics

Learning Project Name	Specific Work Tasks
Project 1 DC Circuit	Task 1 Electrician Instrument Task 2 Lantern circuit Task 3 Design, installation and measurement of mechanical multimeters
Project 2 AC Circuit	Task 1 Advertisement Light Box Circuit Task 2 Commercial Electrical Circuits
Project 3 Transformer and Motor	Task 1 Manufacture of Transformer Task two Disassembly and testing of three-phase asynchronous motors
Project 4 Low-voltage electrical appliances and their control circuits	Task 1 Electric fan control circuit Task 2 elevator control circuit

The above teaching content basically contains the basic knowledge of the "Electrical Technology" course, and removes some knowledge points that are not used in work life and follow-up courses, such as formula derivation and calculation.

#### 3.2 Change teaching methods

Effective teaching methods are a direct means of obtaining good classroom teaching results. The traditional classroom is based on teachers, and students are passive in their acceptance of knowledge. The teaching results are not satisfactory. Teachers also need to keep learning, learning new teaching ideas and teaching methods, and adopting different teaching methods for different teaching contents. Can use the now more mature task-driven teaching method, example teaching method, theory and practice combined with the integrated teaching method.

Taking the integrated teaching method based on the combination of theory and practice of the work process as an example, in the classroom teaching, specific tasks can be divided into five phases.

① Design task. How to design the corresponding teaching task according to the teaching requirements and the actual project is the most important link in teaching. The teaching tasks designed should conform to the reality of production and life, and include all knowledge points and skills, so that students can clearly define tasks and eventually complete tasks.

② Arrange tasks. Tasks are usually completed by members of the team, so design tasks must be clearly directed. When deploying tasks, all members of the group must first understand the

mission's purpose, meaning, completion time, and effects, etc. Then the members of the group conduct division of labor and cooperation, and finally present the research results of this group in different forms.

③ Analytical tasks. When the teams receive the task of this group, the first thing to do is to analyze the tasks. Define the process of the task and decompose it into specific small tasks assigned to the team members. Teachers play a guiding role in this process. They need to guide students to think and explore the ideas and methods for accomplishing this task.

④ Perform the task. Under the guidance of teachers, students complete relevant tasks. Teachers have different guiding roles for different tasks. For example, the role of a commonly used instrument for electricians in the task of a project, the task focuses on the standard use of students' instruments and technical principles, teachers need to focus on guiding students to grasp the details. The task-advertising light box production in the second project is more of a student-inquiry-based learning approach. The focus of the teacher is to guide the students in the group to collaborate together to better complete the task.

⑤ Evaluation tasks. Evaluation is a more effective way for learners to feedback after learning, and it also fully reflects the knowledge that learners need to master. Traditional teaching evaluation tends to focus on results and ignore the process. The comprehensive teaching method based on the combination of theory and practice of work process is to establish a comprehensive evaluation. Comprehensive evaluation can be made from the following aspects, as shown in Table 2:

Table 2 Teaching evaluation form of basic work process

task:					
	Professional knowledge understanding 20 points	Mastery of professional skills 20 points	Team spirit 30 points	Information acquisition and organization 15 points	Participation in attitude 15 points
1 group 1					
1 group 2					
1 group 3					
1 group 4					
.....					
Remarks:					

The traditional end of the semester exam only emphasizes the results, there is no assessment of the process, the introduction of the stage process evaluation mechanism, the evaluation of students is comprehensive, multi-faceted, has a very good role in promoting the overall quality of students.

#### 4. Conclusion

This paper focuses on the "Electrical Technology" course offered by the non-electrical majors in higher vocational colleges. Firstly, the paper analyzes the teaching status of the course. Then, according to the problems existing in the classroom teaching, it proposes a classroom teaching based on the combination of theory and practice of the work process method. It is recommended to divide the specific tasks into five stages and design a teaching evaluation system.

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