

The Electrical Part of Power Plant Based on Cloud Classroom Research and Practice of Course Teaching Model

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Abstract: "Electric Part of Power Plant" is an important professional course for students majoring in electrical engineering and automation. The course is practical, and the traditional teaching mode can not achieve the ideal teaching effect. In this paper, network technology and "cloud classroom" are introduced into the teaching practice of "Electric Part of Power Plant", and the existing problems and solutions of the course are studied and discussed from the aspects of educational concept, teaching model and course structure.

1. Research Significance

The electrical part of power plant is an important professional course for students majoring in electrical engineering and automation. This course is mainly about power plant and substation electrical a system of basic composition, working principle, design method and theory of operation, causes the student to obtain the necessary basic knowledge of the power plant and transformer substation electrical part, preliminary master power plant and substation main electrical system design and equipment selection and calculation method, sets up the theory with practice point of view, Cultivate students' application knowledge and ability, and lay a necessary foundation for the design, overhaul, installation, operation, maintenance and management of power plant and substation related electrical parts in the future.

The electrical part of power plant is one of the important professional courses of electrical engineering. The development of this course needs to be established after the mastery of basic courses of electrical engineering. At the same time, this course has the characteristics of strong professionalism, requiring field experience and difficult to understand the formula. Starting from the teaching model, this paper discusses the development status, advantages and disadvantages of traditional teaching and flipped classroom teaching. Based on the characteristics of flipped classroom, based on students as the main body, the process of engineering practice is directly introduced into the classroom in the form of "cloud classroom", and a set of feedback interactive hybrid teaching model suitable for the use of courses is constructed. As an engineering discipline, theoretical knowledge should be combined with practice, focusing on cultivating students' ability to solve engineering practice problems, so that students can understand practical engineering tasks through "cloud classroom", understand and apply basic knowledge to solve problems. The proposed

teaching method can promote the improvement of the teaching quality of the electric part of the power plant course, and provide important reference suggestions and support for the improvement of the course teaching method. At the same time, it lays a foundation for students to engage in related work after graduation.[1-2]

2. Application Prospect

In the process of teaching implementation, this series of courses and practical content has its unique advantages compared with similar courses in domestic schools of the same level.

Advantage one: educational concept

Due to the advanced educational concept of the course, there are some innovations in its teaching mode, teaching methods, teaching means and teaching resources.

Advantage two: teaching mode

Integrate classroom teaching and information technology into curriculum design and knowledge delivery. Through the actual project applications of "cloud" will be directly into the classroom, make school more direct understanding of the actual engineering work, for students to understand the theoretical knowledge is more intuitive, efficient, using the latest Internet technology and information means to the teaching process contains teaching preparation, teaching, teaching evaluation, according to the teaching evaluation, teaching reflection, prepared for the classroom teaching, The content of the teaching process is displayed, students' homework is consolidated after class, and problems are fed back to the next teaching, forming a complete closed loop.

Advantage three: course structure and content system

For the power plant electrical part of the course is a discipline of engineering practicality is strong, and it is the study of the large power system and its main components, difficult to contact directly in our daily life, only on the description of the book and the teacher's explanation is very difficult to let the students understand the priorities and relationship, therefore, Usually, video introduction will be added in class for students to have a more intuitive understanding. If possible, students will be taken to visit power plants and substations to intuitively understand the design, overhaul, installation, operation and maintenance management of power plants or substations. However, due to the impact of the epidemic in recent years and the stricter management system of power plants and substations, it is difficult to realize the field visit of students. Therefore, the main content of this course reform is to adopt the form of "cloud classroom" to introduce enterprises into the classroom and bring students into the scene. With the development of network and computer technology, AR technology is also advancing rapidly. In the next stage, students can not only realize on-site visit, but also realize on-site simulation operation.[3]

3. Status Analysis

In the process of teaching implementation," Electric part of power plant "is mainly the practice and experimental teaching link of specialized course. Due to the high risk and uncontrollability of on-site practice teaching in thermal power plants, it is difficult to teach, costly and difficult to ensure the teaching effect. Although according to the requirements of the teaching syllabus, undergraduates are organized to enter the real thermal power plant for cognitive practice every year, due to the power generation task of the power plant, the units are all in working state, so students can not effectively understand the three main engines and corresponding electrical equipment of the power plant, coupled with the short cognitive time and other objective factors[4]. As a result, students do not know enough about the operation process and electrical control of the power plant. In the traditional teaching mode, teachers generally occupy the dominant position in teaching, and its advantages are relatively clear, that is, teachers are convenient to manage the teaching process.

Undergraduate education in our country for the socialist construction is one of the core target of innovative and dedicated training talents, however, the traditional teaching model because of its inherent teaching mode of the subordinate relationship between students and teachers, often unable to cultivate students' interest in learning and inspire students' innovative ability, at the same time, the traditional teaching mode to cultivate talent is generally based on theory is given priority to, The training of talents practice and practical application ability is poor[5].

3.1 The Situation and the Main Problems before the Curriculum Reform

3.1.1 Some Teaching Contents are Outdated

Some of the technical methods and means involved in the course are backward or small application, such as oil circuit breaker, part of the secondary system content, etc. Course content update speed is slow, a lot of knowledge is common sense, lack of the introduction of current advanced technology.

3.1.2 Single Teaching Method

Traditional teaching is teacher-centered, mainly based on "infusion" and "one-way" teaching mode. Teaching is mainly taught by teachers in class, which has low teaching efficiency. At the same time, students' performance assessment generally adopts closed-book method, which cannot reflect whether they can really grasp the concept and essence of design. This is not suitable for cultivating students' ability of independent thinking and engineering innovation.

3.1.3 Practical Teaching Is Difficult

The experimental teaching of "electric part of power plant" is difficult, costly and difficult to ensure the teaching effect due to the high risk and uncontrollability of on-site practice teaching in thermal power plant.

3.2 Reform Measures to be Adopted In View of the Above Problems

3.2.1 Optimize Resources and Integrate Interdisciplinary Theories

For the interrelated different course knowledge points, integrating them and assisting each other in the teaching process can help students to learn and master this kind of knowledge points. Actively explore the student-oriented teaching mode, make students consult materials after class as much as possible, participate in class discussions, and regard knowledge imparting as a two-way interactive behavior of "teaching" and "learning". However, teachers should act as mentors and give full play to their role in guiding, helping and encouraging students' self-directed learning. Through the actual engineering problems as the breakthrough point, guide students to solve engineering problems as the goal, complete the process of students' active knowledge, independent choice, self-deepening.

3.2.2 Optimize Teaching Methods and Reform Traditional Teaching Models

First, through the teaching platform, teachers and students through the network, to achieve real-time multimedia teaching. It is rich in teaching models, which can realize teachers' daily preview, class, check-in, teaching, communication and interaction, after-class consolidation and other comprehensive teaching. Maximize the distance between teachers and students. Students can study online, do homework, discuss courses, discuss in groups, take notes, take exams and query

scores anytime and anywhere.

The teaching process makes full use of the existing teaching resources of the school, through video display, classroom interaction, problem discussion and other ways to complete the teaching process, improve the classroom teaching methods, and improve the online learning platform, guiding students to learn and consolidate their professional knowledge on multiple platforms and channels.

Second, the introduction of "cloud" class and enterprise cooperation for students to understand the latest industry trends, understand the enterprise to the requirement of related professionals, network resources and wisdom to the classroom, lets the student in the classroom can intuitive see real working state of the construction site, understand the design of the power plant or transformer substation, maintenance, installation, operation, maintenance and management work. To lay the foundation for students to engage in related work after graduation.

3.2.3 Improve the Effect of Practice Teaching from Multiple Angles

The implementation of practical teaching is mainly achieved through three aspects: one is "see", through "cloud classroom" let students understand intuitively to see power plant, substation is the actual work environment, work content, the main problems to be solved; The second is to "listen", listen to the actual engineering needs, job requirements and problem solving methods of field engineers and staff, listen to the needs of enterprises for relevant talents, the needs of relevant practitioners in all aspects of ability, and listen to the theoretical analysis and summary of teachers in the classroom; The third is "do", design and operate key work links through experimental simulation software, and test students' understanding ability and operation ability.

3.2.4 Construct the evaluation System -- Integrate Ideological and Political Elements

With the comprehensive ability to assess student achievement to realize from the traditional examination-oriented education to quality education, will reflect education elements of the assessment content into the curriculum in the process of assessment and summative assessment, the exploration of professional practice courses and ideological education fusion path, so as to cultivate students' spirit of excellence, the pursuit of perfect, promote the students' professional quality.

In view of the teaching reform, write special lesson plan.

4. Conclusion

Electrical Part of Power Plant, as a traditional course of electrical major, plays an important role in electrical major. This study combines network technology with teaching practice, introduces the teaching mode of "cloud classroom", introduces enterprises into the classroom, brings students into the site, and improves students' professional comprehensive quality and employment competitiveness.

References

- [1] Wang Xianlei, Liu Yuanjie. *Exploration of Teaching Reform of Power Plant Electrical Part Based on Engineering Education Concept [J]. China Modern Education Equipment*, 2017(01):47-49. DOI:10.13492/j.cnki.cmee. 2017.
- [2] Tao Li, Wang Jian. *Practice and Reflection on Online Teaching of Power Plant Electrical Course [J]. China Modern Education Equipment*, 2021(11):116-118. DOI:10.13492/j.cnki.cmee. 2021.11.039.
- [3] Chai Hui Fang, Yang Yuhui, Dong Rong, Zhang Zihui, Li Meng, Shen Liyan. *Exploration of Smart Classroom Construction and Hybrid Teaching Application: A Case Study of "Zhiyun Classroom" in Zhejiang University [J]. Modern Education Technology*, 2022, 32(05):110-118.
- [4] Tang Xiaoling. *Curriculum reform of "Power Plant Electrical Part" based on split classroom [J]. Journal of*

Electrical and Electronic Education, 2018, 040 (004): 32-36, 75

[5] Xiong Wei, Zou Xiaosong, Yuan Xufeng, et al *Exploration on the theoretical teaching of electrical part of power plant based on project driven and "dual classroom" [J]. Curriculum Education Research*, 2018 (7): 2