Exploration and Practice of Improving Teaching Quality of Motor and Drag Course

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Abstract. "Motor and drag" is an important professional basic course of mechanical engineering undergraduate, the combination of our school's "motor and drag" in the teaching process of the difficulties and problems, how to let the students through the course of learning, to master the basic theory of the motor and the basic analysis method, and actively explore the teaching the reform. Lay a good foundation for the future work. In the teaching practice has achieved good results, significantly improve the quality of teaching, Application-oriented Universities related to the construction of curriculum has certain guiding significance.

1. Introduction

"Motor and drag" is the mechanical specialty in our college is an important professional basic course, such as mechanical design manufacturing and automation, mechanical and electronic engineering, mechatronics, undergraduate compulsory examination course, it in the system and syllabus course occupies an important position. Because this course is rich in content, strong theory and extensive knowledge, a large amount of information, update the development of fast, and relatively abstract, mathematical derivation, difficulty, and with the class of continuous compression, so how to improve in a short period of motor and drag the classroom teaching, good teaching effect in a short period adduction has become an important issue for teachers to consider. For a long time, "the teacher - blackboard" or "teacher's electronic courseware" has been adopted in the course of "electrical machinery and drag", and the classroom teaching mode of students has been adopted. For a long time, the classroom teaching method of "teacher blackboard student" or "teacher electronic courseware student" has been adopted in the course of "electrical machinery and drag". Lecture on the blackboard, the teacher's analysis on the blackboard, tend to draw a lot of curve, when the number of factors analysis, often difficult to use several color limited their distinction, and curve accuracy is difficult to guarantee, the intuitive analysis results lack of visual system, allowing students to understand and accept; to start learning, students have great interest in learning, as the course gradually increase the depth and difficulty, some students is a bit too, will slowly give up. In addition, an important part of practice teaching is the teaching of the course, but in the experiment because of the existing hardware conditions, often do not coincide with the experimental value and theoretical value, is not up to the expected results. Therefore, it is necessary to reform the education and teaching of the course of electric machinery and drag.

2. The Problems Existing in the Course of "Motor and Drag" Teaching

2.1 Teaching hours are too small to be allocated

With the deepening of the reform of higher education and teaching, the specialized basic courses and engineering courses are obviously compressed, so there is a contradiction between the teaching content and the teaching hours. "Motor and drag" course teaching need 70 hours or so, some professional courses even compressed into 40 hours' limited time to explain the thorough, is difficult, students need to use a very short period of time to fully understand the content of teaching is not easy.

2.2 The concept of complex, many formulas, students difficult to understand

Because this course involves many basic courses, college physics, higher mathematics, circuit and magnetic circuit, electrical engineering, so how to put all the courses together organically presented to students, is a very difficult problem. In addition students feel it is abstract and difficult to understand,
especially, magnetic vector analysis into the inside, because the students on the circuit understanding is only on the surface, the student is not interested in students, some students initially determined to learn this course, but with the deepening of curriculum, students gradually give up. In order to prevent students from appearing in the classroom, the teacher needs to add more basic knowledge and basic concepts, which increases the contradiction between the teaching content and the teaching hours. In addition, the theoretical deduction formula is many, very difficult to remember, the student studies uninteresting.

2.3 Theory is divorced from practice
"Motor and drag" course teaching has a certain depth of theory, and practice is closely integrated, systematic and operational. The teacher said a lot of theory in the classroom, although spent a lot of time labored, but students lack the perceptual knowledge, understand what is not easy, in the face of the real problem will arrange courses incapable of action, the practice is not appropriate, not compact, obviously out of line with the theory, from theory with the practice of students' learning approach will lead to low efficiency, poor operating capability, is not conducive to the overall process of optimization of the course.

3. Improve the Teaching and Practice of the Teaching Quality of Electrical Machinery and Drag

3.1 Adjust the content of classroom teaching. Pay attention to pre exhibition and post extension.
The main way of classroom teaching is not only to impart knowledge, but also an important way to train the mode of thinking, and is the basis of other teaching links. Classroom teaching is not only a course of tens of minutes, but includes three stages: classroom teaching, pre exhibition, classroom teaching and after class teaching. The three associations form a complete whole.

(1) Pre exhibition of classroom teaching. It's well prepared and keeps standing regularly new. Lesson preparation is the premise of a good lesson. It is the starting point and foundation of classroom teaching and classroom teaching is an important component of the quality of teaching. Familiar with the material, including the preparation: reading the literature links, in-depth understanding of the students, teaching plan, teaching plans, with each round of teaching experience accumulated base and rich, continuously adjust and improve the preparation process.

(2) Classroom teaching. First of all, pay attention to the "Introduction" course. A good beginning is half the battle, so we must make a good introduction in our teaching. The author has carried on the optimized combination of the teaching content of the motor and the drive, and in the actual production, the application case of the motor drive, this kind of teaching, causes the student to have the intense desire for knowledge, and enhances the study interest. Second, pay attention to adjust the teaching content, the positioning accuracy to accurately define the concept of depth, moderate difficulty, finally, pay attention to the essence of typical examples or exercises, the purpose is to enable students to learn the basic concept, basic theory and basic methods to analyze and deal with the problem. At the same time, strengthen the students' basic concepts, basic theories and basic methods of profound understanding.

(3) After the extension of classroom teaching. Questions and exercises is an important part of the teaching course of electric motor and drive, is to further understand the content of teaching and consolidation, through exercises and a large number of problems, through questioning and thinking training, not only can consolidate the basic theory, but also can grasp the calculation methods of basic engineering, improve the analysis and solving engineering problems ability.

3.2 The rational use of a variety of teaching methods and means
(1) Inductive teaching method. Significant features of classroom teaching is to teach a lot of knowledge in a short period of time, a large amount of information, content, related knowledge and teachers of content to summarize the main points, summed up the conclusion of knowledge, make systematic and methodical, and extract the key points and difficulties.
(2) Discuss the learning method. Through independent study, one can quickly grasp a part of the teaching, but the problem is that the depth of understanding is not enough, a problem for the students, part of the contents, which can alleviate the contradiction between the lack of time, the classroom teaching, classroom discussion, extracurricular learning organic combination of the three.

(3) Heuristic teaching method. Heuristic teaching method not only asks students questions, but also prompts students to consider and solve problems, and inspire students to think positively. It points out the essence of the problem, and then encourages students to get the solution to the problem.

(4) Comparative Teaching method. In order to make the students master the basic concepts, we can find out the similarities and differences between the two objects by comparing methods. For example, the analysis of the working principle of the DC motor, we can learn the DC motor and DC generator comparison, comparison can be no-load operation of transformer and load operation and motor rotor three-phase asynchronous motor rotor static, and can effectively improve the students to understand and master the knowledge, but also make the thick thinning materials.

(5) Teachers should try their best to find suitable ways to present them to students. Timing judgment in three-phase transformer connection group said, the teaching method is clock method, because the electrical knowledge of students is not very good, and the vector concept is abstract, students to understand and master this method is not very ideal, so we refer to the papers summarized a method of digital method, namely "the same name 12 synonyms 6, inverse, side inversion, core column, sequentially, plus 4 plus 8", which reflects the students look very good judgment, high precision, simple judgment, easy to understand, it is easy for students to master, the original students feel the connection group judge exercises the students have a headache in an instant. For magic, it is the strength of the method!

(6) Students participate in teaching methods of teaching. Of course, it is easier to understand and master the previous chapters to encourage students to participate in classroom teaching. For example, students participate in classroom teaching of three-phase cage induction motors to calculate the stator symmetrical starting resistance, effectively mobilizing the enthusiasm, the students' learning interest and initiative.

3.3 Pay attention to the cultivation of practice and innovation ability

The development of engineering education can’t be separated from the sparks of practical ability and creative thinking. The course of electric power and drag should also train students' creative thinking with the times. The mode of personnel training in Anyang Institute of Technology emphasizes on the improvement of students' practical ability and creative ability. Adhere to personalized training of knowledge and ability of top-notch talent. The school can arrange all the students to practice in the big enterprise of the motor manufacturing, the internship time can be about two weeks, and each student of the internship assign different practice tasks. Through practice, students generally have strong ability in experiment, calculation, drawing, test, design and computer application, and have the ability of independent analysis and solving practical problems. The school hopes that every go out from the Anyang Institute of Technology graduates can become the "innovation project" in the active member of a senior technical personnel in the enterprise can take charge as chief of the. The courses at Anyang Institute of Technology are highly analytical and require a strong ability to think and solve problems. "Education is the key to solving problems," says a senior education professor at the Anyang Institute of Technology. "We need to learn creativity, independent thinking, and bold innovation." Through the cultivation of creative thinking, the students are generally rich in imagination, accurate judgment, keen observation ability and independent innovation ability.

3.4 Applying modern educational techniques and means

Compared with the traditional teaching methods, multimedia teaching has better visual attraction and impact. But the multimedia teaching, the teacher not only pay attention to multimedia and forget the teaching master students, we can also combine the traditional teaching method and modern teaching method, using computer aided design software in the classroom teaching, classroom teaching to meet the needs of various forms of interaction between teachers and students, active
classroom content, will be boring abstract knowledge out, which helps to improve the initiative of student learning and at the same time, it also improves the teaching effect. In the teaching, should try some applications of computer technology using lectures, recitations, through a variety of teaching activities, to enrich students' knowledge, fully mobilize the enthusiasm of the students, to stimulate students' learning enthusiasm. The teacher can also through email, instant messaging, SMS, mobile phone WeChat, by telephone and other means of communication with the students to discuss, online answering, use a network share, save teaching resources, student work. 5, pay attention to team work spirit and enhance students' initiative.

For some large motor practice projects, students can be divided into several groups, each of which sets up a research team, each of which assigns a different task, the task is integrated and finally done by the team. This approach is close to the actual students, students loved, so each student is actively involved in, and play an individual creative ability and team spirit and awareness of competition. When he saw his work and his ideas, displayed on the screen, he will smile, very contented to experience the joy of success, happiness in the activities at the same time, to obtain knowledge, and also to enhance the learning initiative.

3.5 The introduction of Matlab simulation software

The application of computer simulation tools in the teaching of motors and drives can solve complex mathematical derivations, abstract mathematical modeling, and endless mathematical calculations. These are students in the journey of stumbling block, many students at a jaunty vowed to Study hard, but with the deepening of the curriculum content, most of the students give up halfway, listening to the teacher's teachings and duidui heave great sighs. MATLAB simulation tools introduced, brought a slim chance of survival learning this course for students, can greatly simplify the mathematical derivation and the computational complexity of the process, effectively alleviate the emotional problems in the learning process of students, to stimulate students' learning enthusiasm and interest, but also lay a solid foundation for the further theoretical study later. Simulation results and computational results show that, in order to interact with various influencing factors, to enable students to interact, the motor system has a more comprehensive understanding. Because there are many Simulink based motor models, students can freely use modules, combine their own experimental projects, and build virtual experiment projects, which is of great help to train students' innovative ability.

4. Conclusion

The teaching contents of motor and drag course, the reform of teaching methods, the improvement of students' interest in learning, the initiative and practical ability of students' learning, and the cultivation of students' innovative ability play an important role. Based on the three principles of hierarchy, comprehensiveness and progressiveness, the author discusses the teaching content, teaching methods, evaluation methods and other aspects of concrete practice and teaching reform. Practice has proved that this educational reform can better cultivate the students' innovative spirit and practical ability, and will receive good teaching results and greatly improve the quality of teaching.

5. References


