

Discussion on Teaching Reform of the Course “Fundamentals of Automobile Repacking Design”

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Abstract: This paper proposes the measures for the teaching reform of the Fundamentals of Automobile Repacking Design, including measures to motivate students, optimize teaching content, strengthen multimedia application, and change teaching methods, based on the analysis of the teaching status of the course, and the problems of monotonous teaching styles and poor teaching effect of the course design. The teaching reform of the course will improve the teaching quality, enhance teaching efficiency, and enable students to effectively master basic theories and related knowledge, and basic methods and ideas of automobile repacking.

1. Introduction

The course of Fundamentals of Automobile Repacking Design is a compulsory and important professional course for the automotive service engineering major. In order to meet the needs of the current development of automotive technology, the teaching of this course should also adapt to the current situation by combining theory with practice. Students of this major, no matter whether they are engaged in the design, research and development of automobile, component or parts, or automotive technical services, must have a solid theoretical foundation and professional knowledge. Therefore, this course is crucial in this respect. Based on many years of teaching and observation, it is found that students are not motivated in the course. They are often late for classes, and they do not finish homework on time or do it carelessly. The interviews with students and surveys show that students are not interested in the content and settings of the course. They also think that the time for the course is not appropriate, and that some of the content learned is outdated and monotonous. The teaching team has conducted in-depth discussions on the course, and has greatly reformed the teaching of the course with an effective teaching plan for implementation.

2. Teaching status quo ^[1]

2.1 Basic conditions.

Fundamentals of Automobile Repacking Design is a compulsory course for the major, which is open at the sixth semester. The present teaching plan arranges a total of 32 hours of in-class learning without internship. The teaching is conducted only in the classroom with self-made multimedia courseware. In addition, there is one week for practice (course design).

2.2 Problems in teaching. The course has two sessions: classroom instruction and course design.

2.2.1 Classroom instruction. As an important professional course, it has relatively insufficient course time; the teaching form is monotonous, and the instructional teaching fails to effectively motivate the students; roughly-made courseware is not abundant in information. This kind of teaching fails to attract the students.

2.2.2 Course design is about making an assembly design of a car. In the design process, some students tend to conduct calculation irresponsibly. Though there are certain differences in the data, the students tend to ignore them as long as the results are the same. Therefore, the quality of the final course design is poor, and many students can not achieve the teaching goals.

3. Reform measures

Based on the status quo and existing problems of the course, this paper proposes the following reforms:

3.1 Combining theory with practice to stimulate students' interest in learning

Interest is the intrinsic motivation for students to seek knowledge proactively and effectively. However, the students are not born with the interest in learning. A good classroom lies in how the teacher guides the students and fully mobilizes their initiative in learning. A good classroom can help to optimize teaching and improve teaching outcome. Actual component or assembly analysis based on the textbook theory can stimulate students' interest to explore and learn, and encourage them to use the knowledge they have to analyze problems. For example, why does the front drive motor drive shaft have splines? When the car is running, the wheels jump, and the wheelbase will change. So the length of the transmission shaft must change through the internal and external splines. Practical problems can inspire students to think, discuss, and use the textbook knowledge. In this way, students can easily understand and grasp the essence of the phenomenon and grasp the abstract concept in an interesting way.

3.2 Regarding students as the main body of teaching to cultivate their self-learning ability

Active exploration of the “teacher-led, student-centered” teaching model to give full play to students' subjective initiative. Since the course is a very comprehensive one, solely relying on classroom learning is far from enough for truly mastery of the course. Students need to systematically learn the design of specialized cars and master the knowledge of automobile make-up design in the automobile service industry. Therefore, it is more important to help students to learn how to learn and improve their self-learning ability.

3.3 Timely updating and optimizing the teaching content ^[2]

The reform of teaching content is the core of curriculum reform. It is necessary to timely update and optimize the course content, so as to reflect the advanced, targeted, practical content based on case analysis.

3.3.1 The advancement of teaching content has a great impact on the design basis and manufacturing technology of automobile repacking with the wide application of new technologies, new processes, new materials, new equipment in the field of automobile manufacturing as well as the rapid development of this industry. Due to various factors, the content of the current textbooks is outdated and not in line with the current status of enterprises; therefore, we should strengthen the teaching of modern design knowledge.

3.3.2 Pertinence of teaching content. Automobile manufacturing and related enterprises are the main channels for the employment of the students of this major. Therefore, it is important to update and optimize the teaching content timely based on the needs of related enterprises. The teaching cases should be selected from related companies, and the design ideas and methods used should be in line with the actual production.

3.3.3 Practicality of teaching content. While strengthening the basic theoretic and professional knowledge, we should pay attention to the teaching of practical technology, insisting on the combination of knowledge teaching and the cultivation of problem-solving ability.

3.3.4 Practicality of teaching content. Fundamentals of Automobile Repacking Design is a very practical course, aiming to cultivate a car repacking designer with abundant design knowledge and experience after long-term practical training. To this end, it is important to make the course more practical in teaching. In addition to the existing practical teaching (course design and computer experiment), this course will open a class for practice, focusing on the comprehensive training. In this way, students will deepen their understanding of the theoretical knowledge they have learned, and basically master the methods and ideas of car repacking design.

3.4 Integrating multimedia and blackboard teaching

Multimedia resources can help to present the abstract theory and the structure of cars and parts

(animation and graphics) in front of students in a more vivid manner, which not only makes the teaching content more real, but also stimulates students' interest and initiative in learning. In this way, students can better understand the textbook, thus improving the teaching effect and efficiency. However, excessive use of multimedia tends to limit the students, suppress the space and time for independent thinking, and weaken the interaction between teachers and students. Appropriate and timely blackboard writing in class can help to summarize the difficult and important content, organize teacher's thinking, attract the students and engage them to think. At the same time, it promotes the interaction between teachers and students, and make the class more lively. The effective combination of the two teaching methods of multimedia and blackboard, based on the context, collaboration, dialogue, can mobilize the students and enable them to effectively master the knowledge taught in class.

3.5 Diversified teaching methods ^[3]

First, invite experts from outside the school to give lectures. Take the appropriate time (4 hours) from the teaching plan, and divide it into two units (2 hours per unit). Then, invite two experts who are engaged in automotive technology (automobile repacking design, automotive technology development, automotive technology research, automobile manufacturing, automobile testing, etc.) to communicate face-to-face with students and share their successful experience in automotive technology. This is what the students want and is a highlight in this reform. Most of the students have the desire to communicate with the experts outside the school, which makes the teaching method feasible. As for the content of the lecture, the two experts can focus on the basic car repacking design technology and the successful experience, and car manufacturing technology and the successful experience, respectively. The characteristic of this teaching method is that the experts are presented as a struggler and winner who are close and appealing to students. The power of the role models can further enhance the students' professional thinking and self-confidence, thus delivering better teaching effect than mere classroom instruction. Second, a teacher-oriented teaching method regarding students as the main body. Classroom teaching aims to guide students to explore knowledge, and inspire and motivate them to learn independently. The following measures can be used: first, establish a basic unit of independent learning. The class is divided into several study groups (9-10 people in each group), and the members recommend a student to be the organizer and representative of the group, whose responsibilities are to organize the study and discussion, collect, categorize, and summarize the opinions, answer the questions posed by the teacher and speak on behalf of the group about classroom-related content; second, carry out classroom discussion. The teacher carefully selects some of the chapters suitable for discussion, and encourages students to acquire knowledge independently through classroom discussion. A week before the discussion, the teacher give the topic for discussion to the students, providing the focus and some questions to promote thinking, so as to improve their learning efficiency and effectiveness. At the beginning of the discussion, the teacher puts forward several questions based on the learning content, and invites the students to discuss and seek answers in group within 25 minutes, during which process the teacher can provide some guidance. After the discussion, each group will have 1-2 minutes to present the results and then answer the questions raised by the teacher. After the representative of the group has answered the questions, the group members can make further explanations, and then other groups can express their own opinions. If the group members have different views on certain issues, the teacher can give a more reasonable answer by means of comments to deepen the students' understanding of the problem after all opinions are heard. After all questions have been answered, the discussion ends.^[4] The teacher scores the performance of the students based on classroom discussion, and make it part of the usual performance. This teaching method is active and lively with individual and group competitions. Therefore, it is kind of like a game, which are more easily accepted by students. Third, the self-learning method. The teacher carefully selected some of the chapters suitable for self-learning and assign some content to the students based on the teaching progress. At the same time, the teacher explains the content of the course after each student has taught for about half a class. In this way, they can learn and consult relevant materials to obtain preliminary knowledge, present it to the whole class

through multimedia courseware, and share their experience with them. After the speech, there will be about 5 minutes for answering the questions from the teacher and the classmates. The teacher will make a supplement to ensure the quality of the answer. Finally, the teacher make evaluations according to the level of teaching and quality of answers as the basis of usual performance. Since this teaching method encourages students to carry out self-learning with the tasks given, it will pose a certain pressure on and provide motivation to students, forcing them to learn more carefully; otherwise they may lose face in front of the classmates. Young people are eager to compete and have strong desire to show themselves. Therefore, this teaching method encouraging students to teach students will motivate them, thus delivering better results.

3.6 Course evaluation system and assessment

In order to ensure the smooth implementation of the curriculum reform and to learn about the learning effect more scientifically, it is necessary to reform the assessment system and evaluation model of the curriculum. It is mainly about improving and refining the evaluation method of the course by combining theoretical examination, homework and usual performance, course practice and curriculum report in different proportions. The examination is about to know whether students are proficient in the application knowledge, avoiding the content depending on mechanical memory. The homework and usual performance focus on the ability of independent learning. The course practice emphasizes the cultivation of programming skills. The curriculum report invites students to summarize what they have learnt in practice, record the gains and problems in the design process, thus developing their ability to analyze and summarize.

4. Conclusion

The teaching reform of the course of Fundamentals of Automobile Repacking Design can further enhance the teaching quality, increase the interest of students, improve teaching efficiency, enhance the students' mastery of theoretical knowledge and application, and improve their engineering practice skills. In order to meet the requirements of talent training in the 21st century, it is essential to constantly update the concept of education and explore new teaching methods and models.

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