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Application of Micro Lesson in Engine Principle Course

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Abstract: ***Principles of engine is one of the car class specialized compulsory core courses, for engine by learning this course hopes to develop the industry more engine design and application talents, with the rapid development of information technology, the traditional blackboard writing + courseware teaching methods can't guarantee the quality of teaching and the teaching effect, In order to improve the teaching quality and teaching effect of engine principle course, this paper first introduces some theoretical knowledge of micro-lesson, and then discusses the specific application of micro-lesson in engine principle teaching.***

Keywords: The class; Engine principle; Teaching.

1. INTRODUCTION

The carrier for achieving the talent cultivation goals of higher education institutions is the curriculum, and the main way to achieve talent cultivation goals is through teaching methods. Currently, micro lesson teaching is a new type of teaching method, characterized by the use of current information technology to present digital resources such as knowledge content and expanded materials in the form of knowledge points. This teaching method has the advantages of short time, precise knowledge content, and ease of learning, making it particularly suitable for current teaching. It will greatly help improve the quality of teachers' teaching and also contribute to enhancing students' learning outcomes. Because more and more schools are widely adopting micro lesson teaching methods.

The course of Engine Principles is a compulsory foundational course for undergraduate students majoring in Vehicle Engineering, Automotive Service Engineering, and Energy and Power Engineering. This article takes the course of engine principles as an example to introduce how to apply micro courses to course teaching in the information age and how to improve the quality and effectiveness of teaching.

2. RELATED THEORIES OF MICRO COURSES

Generally speaking, micro lessons refer to micro videos created by teachers using various mobile devices and online resources related to the course (such as dynamic images, videos, and question banks) based on the characteristics of the knowledge taught. The method of using micro videos for teaching is called micro lesson teaching. Video has become the carrier of key and difficult knowledge in the course. Micro lesson teaching mainly allows learners to learn through micro videos, which is the main guiding ideology of micro lesson teaching and one of the teaching methods commonly used by teachers at present.

In order to facilitate students' online learning and discussion, and to consider their learning characteristics, it is generally recommended to control the duration of micro lessons within ten minutes. During the production of micro lessons, not only should video explanations be included, but also practice questions, discussion questions, and test questions for self inspection, and finally, discussions should be conducted. By using micro videos instead of textbooks, it is convenient for students to learn independently anytime and anywhere, which not only improves their ability to learn independently but also enhances their time utilization.

The reason why micro lesson teaching can stimulate students' interest in learning is because micro lessons have the characteristics of precision and simplicity, and they are dynamic, which can help students with poor imagination improve their learning effectiveness. Therefore, applying micro lessons in curriculum teaching can better assist and improve teachers' "teaching", promote and develop students' "learning".

Micro courses are a product of the development of information technology and the popularization of mobile phones and computers. The emergence of micro courses is conducive to breaking down course knowledge,

allowing students to fully utilize their spare time to learn through mobile terminals such as mobile phones or computers, which traditional teaching methods cannot achieve.

3. CURRENT STATUS OF ENGINE PRINCIPLE TEACHING

The course of Engine Principles is a compulsory course for automotive majors. It mainly covers the working cycle of the engine, performance indicators of the engine, engine ventilation process, fuel combustion, combustion process and mixture formation of the engine, engine characteristics, engine pollution emissions and control, and other knowledge points. It has a strong theoretical basis and many knowledge points, which requires students to have a solid grasp of basic knowledge. However, in reality, most students have a weak grasp of the basic knowledge of the previous pilot courses, which makes it difficult to learn the course of Engine Principles and the teaching effect is not ideal.

3.1 Limitations of Traditional Teaching Models

In the past, vocational college teachers were deeply influenced by traditional teaching methods in the teaching process of automotive fault diagnosis courses. Currently, in the teaching process of engine principles, most teachers use traditional teaching methods, which means that teachers are more focused on teaching and guiding students' learning. They do not consider the subject status of students well and do not attach importance to it. Moreover, during class, the content is purely theoretical and relatively dull. The main focus of the lecture is on engine performance indicators, engine performance analysis, etc. Afterwards, the teacher leads the students to conduct some demonstration experiments, or the teacher conducts them while the students watch and learn. This is currently a commonly used teaching method, which greatly undermines students' enthusiasm for learning and prevents them from having the opportunity to engage in engine experiments during their school years, ultimately affecting their creativity and learning quality. It can also affect students' insufficient understanding of abstract and dry knowledge, which in turn affects their subsequent learning, causing them to gradually lose interest in the course.

3.2 Lack of practical teaching experience among teaching staff

The main purpose of professional course teachers is to enable students to understand and master the theoretical knowledge related to engine principles during the learning process, improve their practical and hands-on abilities, cultivate their creative thinking and innovation abilities, and rapidly enhance their comprehensive abilities, in order to cultivate more talents for the rapid development of the country, society, and industry.

However, in the actual teaching process, the construction of professional teaching teams, that is, the faculty team, cannot keep up. The reason is that applied undergraduate colleges lack sufficient funds, which is more prominent in private colleges. Some teachers even directly participate in the teaching work of the course due to their lack of professional knowledge. Due to insufficient knowledge reserves, they can only provide teaching guidance to students according to the textbook in the actual teaching process. Not only is the teaching quality low, but there is also a lack of teaching experience, which affects the normal teaching work of this course.

3.3 Other aspects

3.3.1 The professional requirements for teachers are also relatively high

In current teaching, traditional teaching methods are no longer suitable for current students. If this teaching method continues to be used, it will completely lose students' interest in learning the course, ultimately leading to a decrease in learning effectiveness. Therefore, teachers can try to solve this problem through micro lesson teaching methods, thereby improving students' learning interest and teaching effectiveness.

Whether the knowledge in course content is outdated is also an important factor affecting the quality of teaching

In today's context, engine technology is constantly being updated, but the corresponding textbooks are lacking and updating slowly, which is a common problem in textbooks. If micro course teaching is adopted, this problem can be well solved by sharing new engine technologies with students, especially the achievements made by China in

the field of engines. This can not only solve the problem of disconnection between textbook knowledge and society, but also enhance students' confidence and national pride.

3.3.3 Compared with other courses, the Engine Principles course requires students to master more introductory courses in the early stage

For example, courses such as automotive construction, engineering thermodynamics, and fluid mechanics have the characteristic of having no fixed main line of content, making it difficult for students to learn.

3.3.4 The content of textbooks is also relatively outdated

Some of the latest technologies involve less, so we cannot accurately grasp the latest developments and cutting-edge technologies of engines, and naturally the quality of teaching is not very good. Therefore, it is necessary for teaching teachers to master more cutting-edge technologies to make up for the shortcomings of textbooks.

The difficulty in improving the quality of teaching and the relatively single teaching methods are also influencing factors

At present, we often use teachers to teach students what they learn, but the content of the engine principle course is relatively complex and there are many difficult to understand and remember knowledge points. If we do not stimulate students' learning interest, they will give up the engine principle course. For example, when explaining the ignition theory of the engine in class, students will find it difficult to understand the mechanism of fuel combustion in car engines. At the same time, they lack a clear and vivid understanding of combustion characteristics, which makes it difficult to improve teaching quality. Therefore, we can use micro lesson teaching methods to allow students to observe the different combustion processes of gasoline and diesel, guide students to think, and stimulate their interest in learning.

4. THE ROLE OF MICRO COURSE TEACHING METHOD IN THE COURSE OF ENGINE PRINCIPLES

4.1 Helps to improve students' learning enthusiasm and interest

Previously, due to the lack of popularization and development of computers and electronic products, as well as limitations in teaching environments and conditions, teachers have long adopted a teaching method mainly based on teacher lectures, and even most courses only have theoretical class hours without experimental class hours. This seriously affects students, who cannot consolidate and understand knowledge from practice, or cannot understand the knowledge taught by teachers in the classroom. Over time, students will lose interest in learning, resulting in a low attendance rate for this course, and even if they come, they will not listen attentively. However, with the popularization of computers and the development of electronic products, as well as the improvement of teaching environments and conditions, applying micro course teaching methods to teaching will be more effective and attractive to students than traditional teaching methods. Because micro lessons are very vivid, it is easier to visualize abstract knowledge through micro lessons, making it easier for students to learn. This can enhance students' interest in learning, and the teaching effect will naturally be better.

4.2 Helps improve the teaching quality of teachers

Considering the strong theoretical and practical nature of the Engine Principles course, in order to improve students' practical skills and understanding of knowledge, and to reserve talents for the country, due to limited experimental conditions such as insufficient experimental equipment, but with a large number of students, the teaching staff will conduct experiments in groups. During the experimental class, there are usually more than 10 students in a group, which can cause the students standing in the back row to be unable to fully participate due to the influence of the students in the front row. This affects the students' experimental operation and understanding of knowledge, and poses a great obstacle to the teacher's teaching. However, using micro lesson teaching, students can clearly see every process through micro videos on mobile terminals. Offline teaching allows teachers to have more time to provide appropriate guidance to students, which is very helpful for improving teaching quality, students' understanding of knowledge, and students' practical abilities.

5. EXPLORATION OF THE APPLICATION OF MICRO COURSE TEACHING METHOD IN THE THEORY TEACHING OF ENGINE PRINCIPLES

Introducing micro lessons as a new teaching method in the course of engine principles can greatly improve the teaching effectiveness, stimulate students' learning interest, and create an active classroom atmosphere. However, in order for teachers to effectively teach micro courses, they need to be familiar with all the knowledge of the course, and create micro videos of corresponding knowledge points based on their characteristics. When making the videos, they should highlight the theme and the knowledge points that most students find difficult or incomplete to understand. In order to ensure the effectiveness of video production, teachers usually need to refer to corresponding examples to develop a suitable micro lesson teaching plan for the course. After the video production is completed, teachers can publish it to students for preview before teaching, which can guide students to learn independently. For example, in the teaching process of the important knowledge points of gasoline engine mixture formation and engine detonation combustion, it is more suitable to use micro lesson teaching methods. Before starting the class, teachers can use cases of abnormal engine operation to introduce the teaching content of this section, and use photography and video to show students the detonation generated during the formation and combustion of gasoline engine mixture, and why it occurs? As a designer, how to avoid this problem in order to improve the durability and reliability of the engine and stimulate students' thinking. In response to this phenomenon, the teacher began to teach students about the relevant knowledge of engine detonation in this section. When teachers explain the relevant theories of normal and abnormal combustion in gasoline engines, they can play related micro videos of both to give students a real and visible sense of context. During teaching, pay attention to guiding students to think actively and carefully observe their understanding of knowledge. Pay attention to knowledge that students find difficult to understand. The evaluation stage of teaching courses is the final stage of course explanation. Through the previous stage of learning, students must master the true causes of engine detonation and the methods and measures to solve detonation. To further consolidate knowledge, after the course ends, the teaching staff can communicate and interact with students online, such as using Study Pass, Rain Classroom, WeChat groups, DingTalk groups, etc. When creating micro courseware, the principle of making it easy for students to understand and learn should be followed, which requires teachers to pay attention to the logic of knowledge points. When using micro lessons for teaching, it is also necessary to write micro lesson plans, with the aim of deepening, analyzing, and explaining the knowledge explained in micro lessons to form a relatively complete set of knowledge points.

6. APPLICATION OF MICRO LESSONS IN PRACTICAL TEACHING OF ENGINE PRINCIPLES

In the process of using micro lessons in the experimental teaching of automotive engine principles course, teachers still need to create excellent teaching videos in advance for students to preview before class. In the experiment, in order to arouse students' interest in the experiment, the teaching teacher can use micro videos to guide students' learning. After stimulating their interest, they also need to consolidate the course knowledge through a series of exercises. The theme of each lesson (theoretical knowledge and experimental knowledge) should be precise rather than excessive. At the end of the experiment, for the teacher's evaluation, the teacher should summarize and analyze the problems that students are prone to make mistakes in the experimental process, in order to help students improve.

In order to further consolidate the effectiveness of classroom teaching for students and pave the way for future experimental classes, teachers should pay attention to observing whether students' operation steps and key points are appropriate in offline experimental teaching. Teachers can use micro lessons to record students' mistakes during the experimental process, and then conduct counterexample teaching or ask students again to guide students to think. At the same time, adopting this method can also play a role in post class review and consolidation, providing a good platform and approach for students' conscious and active learning.

7. CONCLUSION

In short, using micro lessons in the teaching process of engine principles courses is very helpful for improving the quality of teachers' teaching and students' learning outcomes. However, micro lessons cannot be used alone, and should be used reasonably according to the actual situation.

The course on engine principles has strong theoretical and practical significance. Teachers use the new teaching method of micro lessons to explain this course. They can use a micro video system to showcase knowledge of engine principles, improve students' understanding ability, simplify and visualize engine principle courses, and enhance students' ability to analyze and solve problems.

From the above discussion, it can be seen that micro lessons are a new and scientific teaching mode. In the teaching of engine principles courses, teachers should integrate corresponding teaching resources, innovate teaching methods and educational concepts, and pay attention to students' individual differences. They should enable students to learn independently, learn to discover problems on their own, and ultimately solve them. Teachers mainly play an auxiliary role. If teachers want to make good use of micro lesson teaching, they must learn computer technology well, because this is a prerequisite for ensuring that micro lessons can have a good effect in the teaching of engine principles courses.

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