

Exploration of Teaching Practice of Materials for Mechanical Engineering under the Background of Engineering Education Accreditation

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Fund Project: Fund project of Guizhou Education Department: Teaching reform based on cultivating students' engineering thinking and ability under the background of new engineering constructio "2018520119"; School level fund project of Liupanshui Normal University: Teaching reform based on cultivating students' engineering thinking and ability under the background of new engineering constructio LPSSYjg201805; School level fund project of Liupanshui Normal University: Key disciplines of Mechanical Engineering "LPSSYZDPYXK201705"

Abstract: This article starts from the actual teaching, based on the engineering education certification concept of "student-centered and ability-oriented", and proposes some reform measures in the teaching of the Mechanical Engineering Materials course.

Keywords: Engineering Education Certification; Mechanical Engineering Materials; Teaching Methods

Engineering education accreditation is an internationally accepted engineering education quality assurance system, and it is also an important foundation for achieving international mutual recognition of engineering education and engineer qualifications. Its purpose is to promote the reform of engineering education, promote the quality of engineering education, strengthen the integration of engineering education and modern industry, and strengthen the training of engineering education talents to meet the needs of industrial development, thereby promoting the internationalization of China's engineering education, improving China's engineering technology profession, and increasing the international competitiveness of talents. The course Mechanical Engineering Materials is an advanced course for the major of mechanical manufacturing and automation. The quality of its course teaching directly affects the learning efficiency of students' follow-up professional courses, and has a direct impact on students' future professional work. The integration of engineering education accreditation and Mechanical Engineering Materials course teaching is an important direction for the current talent training and education development.

1. Interactive teaching method

In order to mobilize students' interest in the "Mechanical Engineering Materials" course and improve the quality and effectiveness of course teaching, the first step in reforming teaching methods is to improve the atmosphere of classroom teaching and create a relatively relaxed teaching classroom. Teachers can change the traditional lecture-style classroom mode, walk down from the podium to among the students. They should encourage students to make slides, short videos, etc. of the course content to explain to others. This process can improve the overall learning atmosphere, improve the ability of active thinking and learning, exercise students' logical thinking and language expression skills. For example, the teacher can introduce a

topic, first explain the crystallization process of a typical alloy, and then ask two students to come to the podium to explain the crystallization of other typical alloys and the composition structure of the alloy after cooling and calculate the content. Through this interactive teaching method, student-centered teaching philosophy is realized. In addition, after the students have finished explaining the knowledge points on the stage, they can immediately ask questions about what they don't understand, and then the students on the podium will answer them in detail. This process is useful for cultivating students' adaptability, problem analysis, and language organization skills, which has significant effects and helps students improve their integrated literacy ability.

For example, in the teaching of the Materials for Mechanical Engineering course, in order to strengthen interactive teaching and practical teaching, teachers should adopt the application of experimental teaching mode, organize students to carry out metal material hardness test activities through the design and organization of comprehensive experimental projects, so that to give students the opportunity to test and compare the hardness of metal materials. Based on the requirements of engineering education accreditation, to improve the quality of engineering teachers of professional students, it is necessary to strengthen the comprehensiveness of students' knowledge application and focus on mobilizing students' learning enthusiasm and initiatives, and continuously improve students' comprehensive application ability of knowledge. In the organization and development of the teaching experiment activities, teachers can appropriately set up difficult problems, guide students to explore and research in them, and seek solutions to problems. In order to further consolidate the effect of engineering education accreditation, some expansive experiments can also be carried out to improve the original experiments to meet the needs of students at different levels. Based on the requirements of engineering education certification, in the experimental design, it is necessary to pay attention to process quality control, conclusions, encourage students to actively explore solutions to problems, and allow students to check information, determine technology, and handle samples, so as to exercise students' various professional abilities and promotes the development of students in this process.

2. Discussion teaching method

Under the background of engineering education certification, relevant colleges and universities must change their curriculum and teaching mode to improve the quality of talent training and meet certification requirements. They can apply the discussion-based teaching method to the Materials for Mechanical Engineering course to improve the learning interaction between teachers and students, and students and students, to promote the learning effect. At present, in the field of social engineering practice, some new mechanical materials and production processes are constantly emerging, and there are many types of classic processes. These real production cases, new technology materials, and new processes are integrated into the teaching classroom to make the teaching content become richer and diversified, which not only combines practice but also fits theoretical knowledge. It helps to improve students' further in-depth understanding of the subject. Therefore, while analyzing the knowledge points of certain chapters, teachers can ask students to organize extended discussions on some practical engineering cases and new materials.

For example, while discussing the knowledge points of "Material Selection and Heat Treatment Process of Typical Parts and Tools", teachers should let students analyze the selection requirements of different parts and materials, the advantages and disadvantages of the process flow, etc., as well as which heat treatment method to adopt, whether it is more scientific craftsmanship and so on. In this process, after lively classroom discussions, students are motivated to participate in learning to have a deeper understanding of key and difficult knowledge. In this regard, teachers should pay attention to the appropriate guidance of discussion issues, so that students have curiosity and desire to explore, and proportion. When talking about the development of aerospace engineering, teachers should carry out teaching guidance and problem design based on the requirements and development goals of engineering education certification. They need to encourage students to think about why does stainless steel not rust, why strike while the iron is hot, why is there white pollution, and so on. Through thinking about practical problems, students can explore the answers independently, integrate some practical problems into the curriculum teaching practice, and promote the integration of professional theory and practical knowledge. At the same time, students are allowed to study problems in the discussion, gain a deep understanding of the problems, and realize the autonomous acquisition of knowledge and skills.

Based on the limitations of classroom teaching time, teachers can also organize after-school discussion groups. Students can freely form groups, so their willingness to learn is relatively high. Through group discussions, students are encouraged to take the initiative to learn and think, and improve the teaching atmosphere and students' interest. This discussion-based teaching method once again reflects the student-centered educational philosophy. In the process of discussion and learning, students will actively study course materials, consult relevant materials, references, etc. in order to find answers to questions, forcing them to cultivate a good habit of independent learning. In the traditional teaching model, classroom time is limited, teachers need to explain many courses. They are unable to grasp the key points. Students are also very confused and feel difficult to learn. By adopting the discussion teaching method, teachers only need to teach a large framework of teaching content, focusing on explaining some important and difficult points, leaving more problems that need to be extended and thinking to students. Students can dig out some different opinions and knowledge through reading materials after class, discussing with each other, thinking together, and playing freely, to consolidate theoretical knowledge and realize in-depth study. Based on this, the benefits of the discussion-based teaching method have been revealed. It can fully expand students' thinking ability, help students break out of theoretical limitations, analyze and solve problems more comprehensively, help students strengthen knowledge exchange, improve teamwork awareness, enhance the sense of collective belonging and honor, and cultivate students' high professional quality and comprehensive competitiveness.

3. Game teaching method

Engineering education accreditation requires stimulating students' interest in education, which is one of the key elements to ensure the quality of course teaching. Based on the extensive and boring and complex characteristics of the Mechanical Engineering Materials course, in order to fully mobilize students' learning enthusiasm, diversified forms of teaching methods are integrated into different levels of teaching, which is useful for improving teaching effectiveness, helping learning understanding, and absorbing important and difficult knowledge. The principle of game pedagogy is a process of "teaching" and "playing", which realize the concept of "teach through lively activities". Some teaching content is reflected through the game form and spirit of the game, so that students can participate in the fierce game competition. In the state of extreme excitement or even stimulation, the knowledge content is acquired unconsciously.

For example, there are many academic terms in the Mechanical Engineering Materials course. Some terms have certain regular characteristics. For example, they all have a "body". Then in the review stage of the students, the teacher can ask the students to play "Noun Solitaire". In the game, students are required to say a noun explanation with "body", which not only helps to create a good teaching atmosphere but also helps students strengthen their learning content. Through the game-based teaching method, it can also improve students' classroom participation, mobilize students' enthusiasm, activate the classroom atmosphere, transform knowledge points into teaching through games, and achieve the purpose of improving teaching quality.

4. Conclusion

Learning the course Mechanical Engineering Materials is of great significance to mechanical students. Under the background of engineering education accreditation, based on the teaching philosophy of student-centered, result-oriented, and continuous optimization and improvement, teachers need to be brave enough to make teaching reforms. They should continuously change teaching methods, actively stimulates students' learning interests, and dares to carry out teaching practice. In this case, the final teaching quality will definitely be improved.

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