The application of mathematical modeling in college mathematics teaching

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Abstract: The innovative research and development of technology cannot be separated from the support of mathematical knowledge. Mathematics is a basic subject of science majors in colleges and universities. For college students, mathematics is a relatively difficult subject. The application of mathematical modeling can help students understand abstract mathematical knowledge and promote students to put mathematical knowledge into practice. Based on this, this paper discusses the specific application path of mathematical modeling in college mathematics teaching, in order to improve the quality of college mathematics teaching and enhance the effect of students' mathematics learning.

Keywords: Mathematical Modeling; Colleges and Universities; University Mathematics; Mathematics Teaching

Mathematics knowledge is the basic knowledge of all kinds of research, and its importance is self-evident. However, in the past mathematics teaching in colleges and universities, teachers often attach importance to the teaching of theoretical knowledge and calculation, but ignore the cultivation of students' mathematical thinking and practical application ability, which is not conducive to students' employment. Therefore, teachers in colleges and universities should actively explore teaching methods to train students' mathematical thinking and practical application ability, and enhance students' mathematical learning effect. Mathematical modeling is an effective method to combine mathematical theory with practical problems, that is, to establish mathematical models according to practical problems, to solve mathematical models, and then to solve practical problems according to the results [1]. With the increasing social demand for high-quality and compound talents, it is necessary to reform mathematics teaching in colleges and universities and introduce mathematical modeling to make up for the shortcomings of the traditional emphasis on theory and light practice, and cultivate students' mathematical thinking and problem-solving ability. This paper aims to explore the specific application of mathematical modeling in mathematics teaching in colleges and universities, which has certain practical significance for promoting the reform of mathematics teaching and improving the quality of mathematics talents training.

1. The application significance of mathematical modeling in college mathematics teaching

1.1 Promote the deep integration of mathematical theory and practice to improve teaching quality

Mathematical modeling is a teaching method that combines mathematical theory with world problems. Applying mathematical modeling can promote the deep integration of mathematical theory and practice. In the past, teachers in college mathematics teaching often paid more attention to the explanation of theoretical knowledge, which was abstract and difficult to understand, and students gradually lost their interest in learning mathematics. In the long run, it was not conducive to students' actual mastery of mathematical knowledge. Mathematical modeling emphasizes the use of mathematical methods to solve practical mathematical problems, and applies mathematical modeling to mathematics teaching. In the process of constructing mathematical models, solving and analyzing, students can effectively experience the role of mathematical theoretical knowledge in solving practical problems, deepen their understanding of knowledge, and stimulate students' thirst for knowledge and interest in learning. Mathematical modeling can cultivate students' practical ability, solve practical problems and improve teaching quality.

1.2 Strengthen the cultivation of students' innovative ability and improve their comprehensive quality

Applying mathematical modeling in mathematics teaching in colleges and universities is conducive to cultivating students' innovative ability. Innovation is the internal driving force of social development and national development, and it is of great significance to train college students' innovation ability in line with the requirements of social development and national development. The application of mathematical

modeling can cultivate students' creative thinking and creative ability in the process of mathematics teaching. The process of mathematical modeling requires students to constantly try, explore and verify, so as to find the optimal solution or approximate solution. This process exercises students' logical thinking and reasoning ability, and is conducive to stimulating students' innovation ability. Through mathematical modeling, students can learn how to face complex problems, how to propose new ideas and solutions, and use them to try and practice, so as to improve students' comprehensive quality.

2. Application of mathematical modeling in mathematics teaching in colleges and universities

2.1 Change the teaching concept and highlight the principal position of students

To apply mathematical modeling to mathematics teaching in colleges and universities, teachers should first change the traditional teaching concept of emphasizing theory and undervaluing practice, require teachers to change their roles from knowledge imparts to guides, encourage students to actively explore and practice, and respect students' main position in the classroom. In the teaching process, teachers should respect the individual differences of students and teach students according to their aptitude. Each student is unique, the math foundation and learning ability are different, teachers should be based on the actual situation of students, through personalized guidance, teachers should design specific questions according to the students' learning situation. In the process of applying mathematical modeling to teaching, teachers should pay attention to students' learning status, timely help students solve the problems encountered in the process of mathematical modeling, enhance students' learning information, and avoid students' difficulty fear.

2.2 Adopt diversified teaching methods to improve teaching quality

The application of mathematical modeling in mathematics teaching in colleges and universities should adopt diversified teaching methods and introduce mathematical modeling into mathematics classroom flexibly. For example, teachers can introduce practical cases related to the course content, such as population growth model and traffic flow analysis, and demonstrate the description and solution process of mathematical problems through mathematical modeling, so that students can intuitively see the application of mathematical theories in practical problems, thus enhancing their understanding of theoretical knowledge. For example, in the teaching of inequality, the teacher proposed that "a taxi in a place charges 5 yuan within 2 kilometers, and then charges 1.2 yuan per kilometer, and takes a taxi in two places costs 14.2 yuan, and solves the inequality about distance x" [2]. Teachers guide students to solve problems with mathematical modeling ideas, and stimulate students' interest in mathematics learning. Teachers can introduce project-based learning, form a mathematical modeling team, design a series of projects related to mathematical modeling, and require students to work together to complete mathematical modeling problems, so as to cultivate students' teamwork ability. The flipped classroom teaching mode can be adopted. Before class, teachers can provide videos, articles and other resources related to mathematical modeling, so that students can learn independently. In class, focus on group discussion, problem solving, give full play to students' independent learning ability, but also deepen students' understanding of mathematical modeling. In teaching, teachers should actively use digital technology to help students quickly construct and solve mathematical models. Teachers can show the modeling process of mathematical problems on multimedia, so that students can intuitively understand the process and results of mathematical modeling, and improve teaching efficiency. Colleges and universities can also hold mathematical contests in modeling regularly to encourage students to apply their mathematical knowledge to solve practical problems and exercise their mathematical modeling ability.

2.3 Establish a mathematical modeling laboratory to promote exchange research

With the help of the mathematical modeling studio, students who have participated in the mathematical modeling contest over the years and those who are interested in modeling are invited to carry out mathematical modeling practice activities in a planned way, which is conducive to cultivating students' mathematical modeling ability and cultivating high-quality mathematical talents [3]. Therefore, colleges and universities should set up mathematical modeling laboratories with resources inside and outside the school to provide students with a platform integrating teaching, scientific research and practice. In the mathematical modeling laboratory, students can communicate with each other, have access to more mathematical modeling projects and research topics, and discuss with teachers and classmates how to solve

mathematical problems with mathematical modeling. The laboratory should hold academic lectures, seminars and other activities on a regular basis, requiring experts, scholars and teachers with rich experience to give lectures, challenging students' mathematical vision and expanding their mathematical knowledge.

Conclusion

To sum up, the application of mathematical modeling in college mathematics teaching is conducive to improving teaching quality and cultivating students' innovative ability, which is very important for students' future development. The application of mathematical modeling in mathematics teaching in colleges and universities requires teachers to change the traditional teaching concept, respect the principal position of students, and strengthen the personalized guidance to students. At the same time, teachers should adopt diversified teaching methods and integrate mathematical modeling into curriculum teaching. Universities can also set up mathematical modeling laboratories to promote the further development of students' mathematical modeling ability. Through the implementation of the above measures, more high-quality mathematical talents with mathematical literacy and innovative ability can be cultivated.

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