

Enhancing Students' Independent Innovation Ability Based on Mathematical Contest in Modeling

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Abstract: The article analyzes the significance of mathematical modeling competitions and training, studies the important role of mathematical modeling in students' autonomous learning and practical innovation ability cultivation, and explores the internal connection between mathematical modeling and innovative talent training. Finally, I combined with me The actual situation of the school gives more effective measures and areas for improvement in the subsequent mathematical modeling competition training, so that the comprehensive quality of students is further improved, so as to better serve the society.

1. Introduction

Since the 1990s, scholars generally believe that the innovation ability of college students in China is relatively poor, which is mainly manifested in the lack of independent learning consciousness and independent innovation and practical ability. Therefore, the cultivation of university students' innovative ability has become a problem that everyone has paid close attention to. Relying on the mathematical modeling competition, it has played a vital role in promoting the innovation ability of college students. The development of mathematical modeling activities has built college students' ability to improve the computer's application ability, logical thinking ability, and use mathematical analysis to solve practical problems. The platform is conducive to the cultivation of university students' innovative consciousness and mathematical modeling ability [1].

2. Mathematical Modeling Competition and Cultivation of Innovation Ability

One of the main tasks of higher education in the 21st century is to cultivate high-quality innovative talents. At present, exam-oriented education is a common phenomenon in the teaching of college mathematics, which is not conducive to the cultivation of students' comprehensive quality. University mathematics research-based teaching and the cultivation of students' innovative consciousness is an important subject of teaching reform. We believe that integrating the ideas and methods of mathematical modeling into university mathematics teaching is an effective way to cultivate students' independent innovation and practical ability. Students learn through learning Mathematical modeling courses and participation in mathematical modeling competitions have gained scientific research capabilities, and also established effective guarantees and foundations for the organic combination of mathematics and practical applications. In recent years, we have set up mathematical modeling elective courses from the second year of college students. The ideas and methods of mathematical modeling are integrated into the teaching of university mathematics and students' scientific and technological activities, and a relatively comprehensive mathematical modeling teaching activity system has been established, which has improved the students' independent innovation ability [2]. It is mainly reflected in the following Aspects:

2.1 Cultivate Students' Ability to Fully Use Knowledge through Mathematical Modeling Contests for College Students

Through the mathematical modeling competition, students can combine the basic mathematical

knowledge and modeling methods learned in the classroom with specific practical problems, apply mathematical theory to comprehensively analyze and calculate problems, and find solutions to problems. There is no standard answer and no fixed method for the entire process of the mold competition. The same practical problem can be considered from different angles or solved with different mathematical knowledge to obtain different mathematical models. This requires students to have open thinking And innovative ability, but also better integrate mathematical theoretical knowledge into various subject areas.

2.2 Improve Students' Ability to Use Computers through Mathematical Modeling Contests for College Students

The topics of the mathematical modeling contest are all derived from practical problems in engineering technology and social science, and many of them are open questions. The mathematical methods used for different problems in different scientific fields are not the same. The solving process is cumbersome and complicated, which requires students to use computers and corresponding mathematical software packages such as R, Matlab, C ++, Lingo, Eviews, SAS, etc. Therefore, students must systematically perform mathematical software before participating in mathematical modeling competitions. Theoretical learning and computer simulation. This is an effective way to improve students' computer application ability by combining theory with practice.

2.3 Cultivate Students' Innovative Ability and Teamwork Ability through Mathematical Modeling Contests for College Students

In the modern competitive society, talents with good independent thinking ability and teamwork ability are more and more favored by society. Mathematical modeling competition is one of the ways in which this ability is well reflected in the university stage. Mathematical modeling The competition can not be completed by one person. It requires three team members to form a team and complete the topic selection within a prescribed time. Problem decomposition, model building, solution model and model evaluation require the cooperation of team members, Each can do its best, complement each other's strengths, and give full play to the spirit of teamwork to maximize the team's work efficiency. At the same time, the mathematical modeling competition is a system engineering, and a student's participation will greatly improve their own abilities, including using computers The ability to apply, the ability to write papers, the ability to read literature, and the ability to learn autonomously, etc.

2.4 Cultivate Students' Ability to Solve Practical Problems through Mathematical Modeling Contests for College Students

By participating in mathematical modeling training and mathematical modeling competitions, students can develop and train their ability to think independently, analyze problems, and solve practical problems. In terms of course positioning, mathematical modeling courses are different from other mathematics The course focuses on the application, practice, and innovation of mathematics and computers. Therefore, the mathematical modeling course is a tool that integrates various technologies to solve practical problems.

2.5 Improved the Overall Strength of the Instructor Team through the Mathematical Modeling Competition for College Students

The mathematical modeling competition is not only a simple competition, but also promotes the reform of mathematical teaching in modeling. The mathematical modeling instructor team has improved the knowledge structure and broadened the knowledge in the process of mathematical modeling training and competition guidance. Strengthened the consciousness and ability to use mathematical models and computer technology to solve practical problems, and further improved the comprehensive quality of the modeling instructor team [3].

3. Practice of Mathematical Modeling Training and Competition Reform in Our University

Our school is a multi-disciplinary commercial university, with the goal of cultivating high-quality applied and compound professionals with innovative spirit and entrepreneurial ability. In recent years, in order to improve the mathematical modeling ability of our university students, do a good job in mathematics. Modeling training and practical work, and implementation of innovative education, we have taken the following measures:

(1) An elective course in mathematical modeling has been established. In response to students' desire to participate in mathematical modeling contests, and considering the fact that students have a weak modeling foundation, and to ensure the systematicness and comprehensiveness of training, our school has opened mathematical modeling Elective courses. In the teaching of mathematical modeling elective courses, it is divided into four topics for teaching. First, calculate the mathematical modeling competition topics of the past 20 years, and sort out the relevant theoretical knowledge required to solve the problems according to the competition problems. Knowledge-oriented training for students. Secondly, sort out some software commonly used in mathematical modeling competitions including mathematics and economics, and train these commonly used software in theory and computer operation. Third, in the modeling competition How to decompose the problems involved in each topic, that is, how to clarify the problem, decompose the problem, guide the problem and provide special training for the writing of the paper to improve the quality of the paper. Finally, practical training. The teacher's guidance group determines some simulation competitions Questions, let students train, form a dissertation, comment on the student's dissertation, and give reasonable suggestions for revision.

(2) Hierarchical teaching, teaching according to students' aptitude. In addition to specializing knowledge points, according to the discipline nature of our school, students of different majors and different mathematical foundations will implement hierarchical guidance models to enable students to obtain more detailed and comprehensive knowledge, and further Promote the improvement of teaching quality.

(3) Centralized and Intensive Training. Our school conducts a half-month practical training before each large-scale mathematical modeling competition. It mainly focuses on simulating problems to strengthen students to clear the problem, decompose the problem, and finally solve the problem and complete the thesis. The instructor targets students The thesis finds problems and corrects them in a timely manner, accumulating experience to better respond to the real modeling competition [4].

4. Results of Mathematical Modeling Contest in Our School in Recent Years

In recent years, in view of the systematicness and comprehensiveness of our school's mathematical modeling competition training and the improvement of students' innovative ability in mathematical modeling competition, more and more students have participated in it. At the same time, the National University Students Mathematical Modeling Competition and American University Students Mathematical Modeling The competition results have also been improved year by year. In the past 5 years, our students have won a total of 1 first prize, 5 second prizes, and 33 first prizes in Heilongjiang Province in the National University Mathematical Modeling Contest. The Communist Party of China won 3 first prizes and 43 second prizes. Mathematical modeling contests not only improved students' independent innovation ability, but also promoted the teaching reform of mathematical modeling courses and university mathematics courses [5]. A number of provincial and school-level education and teaching reform projects. In addition, the development of mathematical modeling contests has also given a better training to the instructor team and accumulated a wealth of guidance experience. Many instructors have been awarded "excellent instructors" Awards, "Excellent Competition Achievement" and "Instructor Newcomer" Awards

In summary, mathematical modeling competitions and trainings play an important role in improving students' autonomous learning and innovative practical ability. After years of exploration

and practice, although we have accumulated some experience, we still need in many aspects Continuous efforts and improvements. For example, to strengthen the comprehensive ability of the model guidance instructor team, the rationality of the competition student selection scheme, the comprehensiveness of the training content and methods, etc. I hope to improve the overall training level of our school and improve the comprehensive quality of students through improvement. It has been further improved, and our school's competition results have been improved year by year, so that mathematical modeling can truly serve the society and the country.

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