

Mathematics Discipline Competition Promotes Teaching Reform of College Mathematics Course

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Abstract. Firstly, we analyze the development of university mathematics competition and the challenges faced by university mathematics curriculum teaching. Secondly, we propose the organic integration of mathematics competition and university mathematics curriculum teaching and practice reform, and five practical operation methods are advanced. With the application as the guiding ideology and the mathematics competition as the platform, the teaching reform of the university mathematics curriculum and the improvement of the quality of undergraduate teaching are promoted.

Keywords: mathematics competition; independent learning; teaching reform; mathematical modeling; general knowledge.

1. Current Situation of College Students' Mathematics Competition

The mathematics competition for college students mainly includes higher mathematics competitions and mathematics modeling competitions for college students. The higher mathematics competition mainly refers to the higher mathematics competitions of non-mathematical college students in the whole country or in various provinces and cities. The higher mathematics competition is mainly to expand and derivate relevant content on the basis of the advanced mathematics basic knowledge of students, mainly in the form of examination.

The mathematical modeling competition is an abstract and concise characterization of the essential attributes of the actual subject using mathematical symbols, mathematical expressions, procedures, graphics, etc. It may explain certain objective phenomena or predict future development laws, or Provide an optimal or better strategy in a sense to control the development of a phenomenon. In fact, the established mathematical model is generally not a direct copy of the real problem. Its establishment often requires people to deeply and subtly observe and analyze the real problem, and it requires people to use various mathematical knowledge flexibly and skillfully. Mathematical modeling is the process by which this application knowledge abstracts and refines mathematical models from practical topics. The digital model competition is a "problem". Most of it comes from the actual production or scientific research process. It is a comprehensive problem. The data is huge and needs to be completed by computer. The answer is often not unique (the mathematical model is the actual simulation, the approximate expression of the actual problem, its completion is under some reasonable assumptions, so it can only be better, not unique), the reported results Is a "paper". It can be seen that the "digital-analog competition" focuses on application. It is a competition based on the knowledge of mathematics, the ability to use computers and the ability to write articles.

At present, the mathematics modeling competition for college students mainly includes the American College Students Mathematical Modeling Contest, the National College Students Mathematical Modeling Contest and the National Statistical Modeling Contest. It also includes various mathematical modeling competitions held by various regions, provinces and cities. The Chinese College Students Mathematical Modeling Competition is one of the largest extracurricular science and technology activities in colleges and universities nationwide.

2. Challenges in the Teaching of University Mathematics Courses

University mathematics education is a basic course for the cultivation of talents in colleges and universities, including courses in higher mathematics, linear algebra, probability theory and mathematical statistics. In order to meet the needs of the market, the disciplines and professional

categories are constantly expanding. The diversity of mathematics teaching requirements of different disciplines and majors puts high demands on the teaching of university mathematics courses. In this context, we need to actively take advantage of the university mathematics competition, actively organize relevant university mathematics competitions, and fully link the university mathematics competition with the university mathematics teaching in the classroom and school teaching activities. How to effectively combine university mathematics teaching, mathematics competition and practical innovation project, and to grasp the basic content while consolidating the knowledge and cultivating students' general knowledge through extracurricular competition is still the key issue of current research.

3. Integration of Mathematics Competition and University Mathematics Curriculum Teaching and Practice Reform

With the rapid development of the times, the application of university mathematics not only plays an increasingly important role in the fields of engineering technology and natural science, but also analyzes economics, finance, medicine, environment, transportation and data with unprecedented breadth and depth. Waiting for new areas to penetrate. Therefore, we try to combine the university mathematics teaching and the college students' mathematics competition, with the application thought as the guiding ideology, and the mathematics competition as the platform to form the "teaching-competition practice" training mode to improve the students' general knowledge. details as follows:

1. The curriculum assessment methods are diversified. Change the assessment method of the mathematics curriculum, which is divided into the usual grades and the final exam scores. The self-learning part can be set in the usual assessment, and the self-learning topic can be a small application problem, and the submission format is based on a mathematically modeled paper. The students submitted in groups of three. In the process, the students learned the paper typesetting, thesis writing, the use of the formula editor, and the report ppt. General knowledge has also consolidated its knowledge.

2. Open a mathematical modeling elective course. The opening of elective courses provides students with a space for independent study, which helps students to experience the value and role of mathematics in solving practical problems, experience the connection between mathematics and daily life and other disciplines, and experience the process of comprehensively applying knowledge to solve practical problems. Enhance application awareness; help to stimulate students' interest in learning mathematics, and develop students' sense of innovation and practical ability.

3. Infiltrate the mathematical modeling idea and organically integrate the ideas and methods of mathematical modeling into the main courses of university mathematics. In the course, the experiment and practice are added. The mathematics learning is combined with relevant mathematics software. By participating in "demo and experiment", students can understand some abstract concepts and theories in mathematics, so that students can use computers to solve complex realities. problem.

4. Establish a mathematical modeling studio to combine the competition with the extracurricular activities of the students.

The establishment of the Mathematical Modeling Studio aims to cultivate students' creative thinking and innovative ability. Through the studio, students who participate in the mathematical modeling competition over the years and students interested in modeling are planned to carry out mathematical modeling in college students. The teaching practice activities guide our undergraduate students and junior college students to engage in innovative research work, so that some capable students can reach out to some objective practical problems that the university students can.

5. Organize competitions and progress in layers.

- (1) Select students from the first-year university to form a mathematics competition training class in the school, and prepare to participate in the advanced mathematics competition for college students. At the same time, reform the mathematics curriculum's usual scores and join the self-learning practice report section.

(2) At the same time, select outstanding students to participate in the school's mathematical modeling intra-school competition, strengthen the university's mathematics application ability training, and lay a good foundation for participating in the national mathematical modeling competition.

(3) Select students among these students to participate in the National College Students Mathematical Modeling Competition. It is best to cross-team students from different majors in different grades.

(4) With basic training and domestic competition experience, college students with rich experience in reading and writing in English will be selected to participate in the American College Students Mathematical Modeling Competition.

(5) Students can participate in corresponding professional competitions according to their own professional characteristics, such as the Innovation and Entrepreneurship Competition, the University Student Market Survey and Analysis Competition, and the Internet Software Design Competition.

In this process, the students' abilities are cultivated: they broaden the students' cognitive vision, temper the students' perseverance, train the essentials of mathematics, enhance team awareness, develop students' innovative ability, and optimistic and healthy positive attitude.

At the same time, through the training of teaching and mathematics competition, a group of outstanding seniors were selected and trained. They served as members of the mathematics modeling studio and the college mathematics counseling assistants, and became the study consultants in the self-organizing learning activities. "Responsive" college mathematics classroom teaching, form a "learning-race-coaching" senior student aid model, and promote students' comprehensive ability and collaborative innovation.

4. Conclusion

The university mathematics teaching is closely integrated with the mathematics competition of college students. The application thinking is the guiding ideology, and the mathematics competition is used as the platform to form the "teaching-competition practice" training mode and the "learning-race-coaching" student growth model. This will promote the teaching reform of the university mathematics curriculum and the improvement of the quality of undergraduate teaching. To further enhance the collaborative innovation of teaching and learning and the general knowledge of students, the acquisition of students will be diversified.

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