Research on Reforming Higher Mathematics Teaching Based on Higher Mathematics Competition

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Abstract. How to cultivate students’ thinking ability is an important topic in the teaching reform of higher mathematics. Based on the analysis of the function of mathematics competition, this paper explores the way of combining competition with teaching, and puts forward a scheme of promoting learning by competition, teaching by competition and deepening the reform of higher mathematics teaching. On the one hand, it emphasizes that competition and competition training should be used as a platform to stimulate students’ enthusiasm for learning mathematics, improve students’ ability to solve problems with mathematical knowledge, and cultivate students’ innovative thinking; on the other hand, it should take the practical application of mathematics competition as a breakthrough point and take mathematics as a professional service as a purpose to change the original teaching content. And teaching methods. The above scheme has achieved good results in the practical application of Beijing Institute of Graphic Communication.

Introduction

Compared with middle school mathematics, higher mathematics expands and deepens on the level of knowledge, cognition and method, and improves and breaks through rigor and logic. Higher mathematics not only has scientific value, but also has extensive education value. Higher mathematics course should not only impart necessary mathematical knowledge, but also cultivate students' ability to analyze and solve problems, that is, mathematical thinking ability.

Innovation ability is an important part of mathematical thinking ability, and it can guide and help other disciplines or work. Innovation ability is one of the most important, precious and highest-level abilities that people possess [1]. Mathematics competition is an irreplaceable part of classroom teaching, an extension of classroom teaching, and a platform for improving innovative ability [2]. Through mathematics competition, students can be trained to master solid mathematical knowledge on the basis of bold exploration and research to find a good solution to the problem, from different angles to obtain different answers, thus improving the creative thinking ability of College students [3].

Important Role of Mathematics Competition in Teaching Reform of Higher Mathematics

It Helps to Improve Students’ Learning Initiative

Mathematics competitions can increase students’ attention to mathematics. As a result of the attention paid to this subject, students’ initiative in learning has increased, and their attitude to learning has become positive. In this way, it is conducive to the understanding and mastery of knowledge, and the mathematical results will be greatly improved. On the basis of learning mathematics well, through active learning, we can also improve the results of other disciplines. In this way, students' thinking becomes more broadened and innovative thinking can be used to think about problems.
Mathematics Competition is Conducive to Teaching Students in Accordance with Their Aptitude

At present, some students are often "not enough" in the classroom of higher mathematics, mainly because of the knowledge tendencies in the classroom, while neglecting the training of knowledge application, cannot meet the students' learning needs very well [4]. Competition is more attractive to some students who are "not enough" in class. The questions set in mathematics competitions are usually the ones that students have never met in their study and life. In solving the questions, students should not only have professional knowledge, but also have the ability to solve problems flexibly by using their conceptual methods. Therefore, the competition is challenging for students, attracting students to explore knowledge, in the process of exploring knowledge, students will experience success and failure, will also find their own shortcomings, this learning experience will make students very satisfied, for the future development of learning to lay a solid material foundation.

Mathematics Competition is one of the Important Ways to Cultivate High Quality and Innovative Talents

In the teaching process of higher mathematics, it is necessary to train students' ability through various ways, and competition is one of the effective ways. (1) Competition is competitive. Competition is actually to stimulate students' learning competitiveness. Through the excavation of competitiveness, students' learning environment will be stronger, which is conducive to the development of teaching. (2) Mathematics learning is flexible and logical. Mathematics competition can stimulate students' creativity and flexibility, and it can also maintain strict logic in the process. Therefore, mathematic competition can promote students' comprehensive learning. (3) Through competition, we can better give the students the spiritual thought of higher mathematics. With this thinking foundation, they will naturally study the knowledge of higher mathematics. Mathematics competition is a very beneficial activity for college students. The development of this activity has a great role in promoting the cultivation of high-quality innovative talents.

Mathematics Competition Can Promote the Improvement of Teaching Content and Teaching Level

To improve the level of competition, we need to constantly update and change the teaching model, which is of great significance to promote the continuous reform of teaching. Colleges and universities participate in a large number of fierce competition, so how to better train students for the examination is particularly important. Competition coaching courses or intensive training courses are usually conducted. The contents of coaching and training will supplement the teaching contents of ordinary higher mathematics to a certain extent, which is equivalent to the extension and expansion of ordinary courses. This not only solves the better degree of students' need for knowledge, but also weakens the adverse effects of the class differentiation. Teachers must be proficient in mastering more and more extensive problem types and problem solving methods, more profound understanding and understanding of the teaching content, will improve their teaching ability. The traditional teaching method of higher mathematics is improved by combining the competition of Higher Mathematics with the teaching practice of higher mathematics, so as to promote the reform and promotion of curriculum and improve the teaching quality.

Promoting Learning through Competition, Promoting Teaching with Competition, and Deepen the Teaching Reform of Higher Mathematics

Promoting Learning through Competition and Improving Students' Ability to Use Mathematical Knowledge to Solve Problems

Taking competition and competition training as a platform to stimulate students' enthusiasm for learning mathematics, improve students' ability to solve problems with mathematical knowledge, and cultivate students' innovative thinking.
**Strengthen Guidance and Increase Interest.** In the process of teaching, let the students understand all kinds of mathematics competitions, understand the form and content of the competitions, and attract their interest in participating in all kinds of mathematics competitions. At the same time, in the classroom teaching, not only infiltrates the mathematics thought method, but also must infiltrate the mathematics competition thought, thus raises the student to have the strong mathematics interest. When they first entered the university, students wanted to show their majesty in their college years, and they were full of yearning and curiosity for college life and study. Therefore, from the first year of university, teachers should infiltrate the idea of mathematics competition in classroom teaching, so that students understand the significance of mathematics competition. In practical teaching, some mathematics competition questions are added to make the teaching content deepen and widen. The gradual penetration of mathematics competition to students is a process from production practice and then applied to production practice. Learning mathematics is to better solve practical problems, to increase students ‘strong interest in mathematics competition, and to deeply experience the charm of mathematics.

**Create Opportunities and Experience Success.** In order to enable more students to experience success and harvest joy, and finally achieve the effect of stimulating and promoting the teaching of higher mathematics by mathematical contest, besides selecting and participating in the mathematical modeling contest of students normally, they also make preparations and support for the mathematical contest of College students, organize an intramural higher mathematics contest every year and study after the contest. Students are ranked, encouraged to study independently, and rewarded, which can be included in the usual performance test, and finally included in the final examination results. Students can also take part in the National College Students Mathematics Competition results and students ‘innovative credits linked, students are very interested in this competition, learning enthusiasm is also very high, serious study and thinking in class, consolidation and practice after class, teaching effect has improved significantly.

**Strengthen Publicity to Bring Things to the Surface.** Mathematics competitions as the main line of diversified activities, through the organization of competition mode of lectures, exchanges, seminars and other forms, so that students make their own reports, discussions and debates, in the constant exchange of ideas, learning from each other, colliding with the spark of wisdom. Teachers play the role of questioning, answering questions and tutoring. The purpose of this kind of action is to focus mathematics teaching on the activities of mathematics practice, give full play to students ‘greater potential and subjective initiative, and provide students with a space to display their talents.

**Establish a Group and Strengthen Team Work.** In the second year of college, students who are interested in mathematics will be organized into a math competition training and learning group to conduct centralized learning and training. According to the different characteristics of the major groups, each learning group has different goals, different emphasis, under the leadership of the team leader for open learning. Each group collects the open test questions into a test question bank. Everyone can do, discuss and explain with each other so as to deepen the understanding and understanding of mathematical knowledge. Students ‘mathematical ability will be greatly improved. By studying the annual mathematics competition questions, analyzing and summing up the various types of problems to find a variety of solutions, explore a variety of ways to solve the problem, stimulate the enthusiasm of students to learn mathematical knowledge. Finally, the development of competitive learning groups is extended to school associations, allowing more students to participate in mathematics competitions, which not only cultivates students ‘ability to solve problems, but also cultivates students’ team consciousness and innovation ability.

**Strengthen Counselling and Strengthen Ability.** In order to enhance students ‘understanding of mathematics competition, we invite mathematics competition experts to give lectures to the mathematics competition group. Through the lectures of experts, students can feel the charm of mathematics. Mathematics brings benefits to our life. Mathematics competition becomes a platform for students to improve their abilities. In addition, a mathematics competition elective course is offered for students who want to participate in the mathematics competition. The purpose of this paper is to train students ‘mathematical thinking, improve their mathematical thinking ability, and
make them possess the qualities of analyzing and solving problems. The annual mathematics competition not only improves students’ mathematics quality, but also stimulates students’ interest in learning mathematics.

**Promoting Teaching with Competition, To Promote the Reform of Teaching Contents and Methods in Higher Mathematics**

Taking the practical application of mathematics contest as the breakthrough point and taking mathematics as the professional service as the purpose, the original teaching contents and teaching methods should be changed.

**Reforming Teaching Contents and Paying Attention to Knowledge Application.** The content unity of higher mathematics teaching is strong, the innovation is weak, so most students are not interested in higher mathematics. Competitive ability training and the traditional ability training of students have differences, so it needs to be changed in content, so that its content can meet the needs of ability training. In setting up the teaching content, we should pay attention to the application of mathematics in real life and professional fields, the importance of cultivating mathematical thinking, and the habit of cultivating students to solve problems consciously by using quantitative viewpoints. In teaching, teachers should design some open questions appropriately. Open test questions are not unified and standardized answers, students can according to specific questions, theory with the actual situation, make different innovative answers. One of the more difficult problems in mathematics contest is the open test. Through the training of open test, students not only have the ability of divergent thinking, but also improve their ability to adapt to the changing circumstances. Through such training to tell students, in the future on the road to entrepreneurship, there are likely to be different situations, the road to success is tens of millions of, which is one of the characteristics of innovative talent training.

**Reforming Teaching Methods and Adopting Inquiry and Heuristic Teaching Mode.** A heuristic teaching mode is adopted to raise questions and guide students to solve problems. In teaching, we should attach importance to the situation of innovation and let students construct their own knowledge system actively, not only the passive recipient of knowledge. We should guide students to study independently and distribute the teaching contents reasonably into three parts. One is to explain in class, the other is to let students study independently after class, and the other is to explain in the form of discussion class. It can not only save teaching time, but also help students to better understand the teaching content, stimulate students’ interest in learning, cultivate students’ initiative and innovation so as to better serve the subject competition. For example, the teaching content of the "infinitesimal method" can be put in the classroom teaching, by giving several typical examples to let students understand the idea of the infinitesimal method and grasp the essence of the infinitesimal method, and then lay the foundation for the application of definite integral; and the application of derivative and definite integral related content can be put in the extracurricular self-study, because the students have already. After learning the definition and nature of derivative, the definition and solution of definite integral, if we explain this part of the content in the classroom too much, it cannot arouse the interest of students and occupy a large number of school hours. Therefore, under the guidance of teachers, arranging students to study independently after class can play a multiplier effect with half the effort. Lectures can be arranged with unintelligible teaching content.

**To Strengthen the Training of Mathematics Competition Examination Questions, and to Cultivate College Students’ Innovative Ability.** Through the summary and reflection of mathematics contest activities, students’ innovative ability is promoted, and students’ ability of analyzing, reasoning, inducting, proving and calculating comprehensive applied mathematics problems is cultivated. In the competition, attention should be paid to the cultivation of students’ ability to transfer their existing experience and methods. In the process of solving problems, it is often "changing the questions to be familiar with dealing with strangers”. When answering the ever-changing competition questions, we should learn to change the questions from different perspectives. In the training of mathematics competition questions, we should actively develop the
students‘imagination, associate the mathematics knowledge we have learned, adopt the methods of analogy and contrast, find out the key to solve problems, break through the inherent problem-solving mode, and realize the cultivation of students‘creativity. By using the interest group of mathematics competition, students are encouraged to study in exploration, study together, and study various methods of solving problems; communication is strengthened to improve the ability of solving multiple problems in the process of solving problems, so as to enhance students‘divergent thinking ability. Teachers should consciously train students in reverse thinking, and gradually let students master the strategies and methods of reverse thinking. Through the day after tomorrow, the students‘ability of reverse thinking can be improved by [5].

Summary

college students‘mathematics competition is an important part of the current higher mathematics education. It plays a very good role in improving students‘innovative ability and promoting mathematical thinking, and it also strengthens students‘comprehensive quality of mathematics. The introduction of higher mathematics contest in daily higher mathematics teaching helps to deepen the teaching reform of higher mathematics. "Competition for teaching" is conducive to improving the teaching level of teachers, "Competition for learning" is conducive to improving the overall quality of students. It is of great significance to combine the contest activities with the course contents and change the teaching mode in order to promote the teaching reform.

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