### Research and Practice of Talent Training Mode of Ordinary Undergraduate Universities with the National College Students Mathematics Competition as the Starting Point

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Abstract: Ordinary undergraduate colleges focus on cultivating application-oriented undergraduate talents, and play a positive role in promoting mathematics competition in application-oriented cultivating talents. Mathematics competition can promote college students 'interest in learning mathematics and improve students' ability to apply mathematics. Through the analysis of the characteristics connotation and of mathematics competition and the situation of undergraduate ordinary universities participating in mathematics competition, this paper discusses the research and practice of the talent training mode of ordinary undergraduate universities with the mathematics competition as the starting point.

#### Keywords: Mathematics Competition; Higher Mathematics; Talent Training; Innovative Talents

#### 1. Introduction

National College **Mathematics** Student Competition is а kind of mathematics competition, which can cultivate students 'innovative thinking and improve students' ability to use mathematical knowledge to solve problems. It is suitable for the majority of students who have studied higher mathematics in undergraduate colleges. The students have a wide range and large quantity. Ordinary undergraduate universities to cultivate innovative talents, from the perspective of mathematics competition, to send mathematics talents to the society, and help the students who have the intention to take the postgraduate entrance examination. Mathematics competition can improve students' ability to use mathematics knowledge to analyze and solve problems, so that students can absorb more nutrients from the mathematics competition, so as to improve their comprehensive quality, and lay a solid foundation for better service to the society in the future.

### **2.** The Connotation and Characteristics of Mathematics Competition

The National College Mathematics Competition aims to stimulate college students' interest in learning mathematics, cultivate their ability to analyze and solve problems, improve the quality of talent training in Chinese institutions of higher learning, promote the construction of mathematics courses in institutions of higher learning, and build a platform for young students to show their mathematical thinking ability and learning results. The first National College Students Mathematics Competition began in 2009 and is divided into two stages: preliminary and final. It is sponsored by China Mathematics Association and is open to national college students. The National College Students Mathematics Competition is divided into mathematics professional competition questions and non-mathematics professional competition questions. Among them, the content of mathematics specialty competition is the content teaching of basic university undergraduate mathematics course, for mathematical analysis accounts 50%, advanced algebra accounts for 35%, and analytical geometry accounts for 15%; the content of non-mathematics specialty competition is the teaching content of university undergraduate higher mathematics course, including function, limit, continuous, calculus, vector algebra, spatial analytic geometry, infinite series and so on. Starting from the fifth game, the final increased 15% to 20% of the content of linear algebra, and for more students, promote students' enthusiasm in mathematics, China mathematics in 2021, the 13th national college students mathematics competition mathematics professional group competition paper is divided

into class A and B, in 2023 the 15th national college students mathematics competition in professional group competition paper is divided into class A class (technology) and B (tube history).[1] The National College Student Mathematics Competition has been paid attention by universities nationwide. Data show that more than 220,000 domestic college students have participated in 2020, and the competition has become one of the college students with the largest influence and the largest number of participants in China[2].

### 3. The Basic Status Quo of Mathematics Competition in Ordinary Undergraduate Colleges and Universities

At present, most of the students in ordinary colleges and universities are admitted to university as the final goal. After entering the university, they do not have the motivation to study and cannot find their own life goals. Most of the time they spend on playing mobile phones, shopping, social networking and other projects, learning mathematics completely to take credits to cope with the exam. And some serious students, these students lack the enthusiasm to learn mathematics, learning mathematics feel boring, no enthusiasm, no sense of direction, in the passive form, and the mathematics competition is not deep enough, the participation rate is not high[3]; many students want to take the postgraduate entrance examination, but because mathematics failed, lead to many students and graduate students missed. This kind of learning state and learning atmosphere is not conducive to the development of students 'innovative ability. We must start from the mathematical foundation of students, and use a variety of problem-solving ideas and clever thinking modes to enhance students' interest in mathematics. We should increase the publicity of mathematics competition, so that more students like mathematics and benefit from it.

The philosophy of ordinary undergraduate universities is to cultivate high-quality applied talents, to adapt to the actual needs of the majority of employers, focus on applied disciplines, no special mathematics school, only the public basic teaching department, both mathematics teachers and mathematics funding investment are limited. In addition, due to the increase of class hours in some professional courses or students' "3 + 1" practice in enterprises outside the university, the total class hours of teaching are not enough, which can only reduce the class hours of basic courses such as higher mathematics, which is very unfavorable to the cultivation of high-quality applied talents[4].

### 4. The Talent Training Method That Takes College Student Mathematics Competition as the Starting Point

# 4.1 Improve College Students' Awareness of Math Competition

Closely combine mathematics competition and daily teaching work, strengthen the propaganda of mathematics competition, from freshmen, help students understand mathematics competition, understand the role of the competition, stimulate students 'interest in mathematics and potential, improve students' interest in learning, let students actively participate in competition, let the students get honor through mathematics competition to confirm their ability, let students have goals to learn. The competition is to guide students to be more interested in learning, not for the sake of competition, and at the same time to help students with postgraduate entrance examination plans to seize the opportunity to improve their math performance and the stage to show their thinking ability. It is necessary to improve students' awareness of mathematics competition. First of all, we should be conscious, so that we can get exercise and improvement in mathematics competition, so as to cultivate more excellent talents.

### 4.2 Lay a Solid Foundation in Mathematics

If the students want to win the good results in the mathematics competition, they must strengthen the basic knowledge of mathematics. Mathematics classroom teaching is the main position and basic way for students to acquire knowledge. Mastering basic the basic knowledge of mathematics can cultivate students with a good mathematical cognitive structure, including mathematical concepts, mathematical formulas, mathematical rules and mathematical theorems, which are the source of problem solving in mathematics competitions. Therefore, the effective competition training should be returned to the basic mathematics classroom, effectively cultivate students' and the problem-solving ability and their mathematical literacy[5].

Encourage students to read mathematics extracurricular reading materials, understand the fine mathematics knowledge from mathematics extracurricular reading materials, understand the major achievements and applications of mathematics development, understand the connection between mathematics and other subjects, can optimize the structure of students' mathematics knowledge.

## **4.3** Set up Math Improvement Classes and Math Competition Clubs

The focus of mathematics teachers is to combine the characteristics of students. Hierarchated teaching refers to divide students into several groups according to the individual differences of students' mathematics foundation, and formulate different teaching objectives, so that they can adapt to the learning needs of students at different levels [6]. For students who like mathematics and want to participate in mathematics competitions, they offer higher interest in mathematics. Teachers use simple competition questions and basic questions to inspire students' exploration and pursuit of knowledge. Stimulate students' desire to learn mathematics. At the same time, we will guide the interested students to actively participate in the competition and the later postgraduate entrance examination.

To ensure competition students team echelon construction, establish mathematics competition club, absorb more students interested in mathematics. mathematics competition community regular propaganda, from freshman and sophomore students selected excellent students into the team, give full play to the backbone of the mathematics competition club leading role, give play to the role of senior "mentoring", help the competition experience and lessons summary and inheritance. At the same time, experienced teachers from other universities are also invited to enter the club to guide students to give lectures, so as to mobilize the enthusiasm of students to participate.

## **4.4 Improve the Construction of Mathematics Teachers**

In order to make better achievements from mathematics competition, ordinary undergraduate universities must improve the teaching level and teaching quality of basic mathematics courses. The ordinary undergraduate course colleges and universities teachers are younger, mathematics competition in the future sustainable development, must be stable and cultivate young teachers, actively carry out teaching and scientific research exchange activities, the teaching and scientific research within the department, let young teachers grow rapidly, act as a mainstay of mathematics competition. Young teachers have achieved excellent results in the competition of guiding students, and their enthusiasm for teaching will be greatly stimulated, and they will sum up experience in practice and form their own teaching opinions. If the teaching level of young teachers is improved, students will get better results in the competition, and then further promote the construction of teachers, and truly achieve the teaching purpose of "promoting teaching by competition".

# 5. The benefits of Mathematics Competition for Cultivating Innovative Talents

## 5.1 Help to Improve Students' Ability to Analyze Problems

To master mathematics is to be good at solving problems, but not entirely in the number of problems solved, but also in the analysis before each problem, exploration and thinking after solving the problem, from the problem to absorb the problem solving methods, thought, exercise their own thinking. Mathematics competition can enhance students 'ability to analyze problems, and improve their problem solving ability. It will also make students have strong analytical ability and problem solving ability in other disciplines, so that students can have a rational way of thinking, and have a great role in guiding students' understanding and learning of other disciplines[7].

### 5.2 It Helps to Improve Students' Innovative Thinking and Comprehensive Quality

Innovation ability is the ability to continuously provide new ideas, new theories, new methods and new inventions with economic value, social value and ecological value in technology and various practical activity fields. In the multiple solutions of college students in mathematics competition is to exercise students' innovative thinking, try to find more ways to solve a problem, analyze the problem from the perspective of innovation, give play to the innovative potential of students in the process of solving problems, and promote students to

constantly improve their awareness of innovation. Students in the process of mathematics competition, the knowledge and problem solving skills system training, the basic knowledge of mathematics has a deep use, on this basis, over time has formed the students 'mathematical thinking, therefore, mathematics competition for college students' innovation ability and the improvement of comprehensive quality has a certain help.

#### 5.3 It Will Help to Improve the Postgraduate Entrance Examination Rate of Ordinary Undergraduate College Students

The college entrance examination of mathematics result of ordinary undergraduate college student is not high generally, the requirement of university basic teaching focuses on the application of basic method and basic formula, take an examination of grind mathematics is more difficult to them, because this success rate is lower many because of mathematics result is low, lead to take an examination of grind failure. The questions of mathematics competition are flexible, which can stimulate students' divergent thinking of students. Students who have participated in mathematics competition can participate in the postgraduate entrance examination in the later stage, and the math questions of the postgraduate entrance examination are relatively easy. Mathematics competition is of great help to ordinary undergraduate students in the later postgraduate entrance examination, and engineering students take a large proportion of mathematics. Through the mathematics competition, the depth of understanding and calculation ability of mathematics are improved, laying a foundation for the postgraduate entrance examination[8]. And have the certificate of mathematics competition can be in the postgraduate entrance examination. Therefore. the ordinary undergraduate colleges and universities promote mathematics competition, help to improve the success rate of students' postgraduate entrance examination.

### 5.4 Lead to form Students' Scientific Spirit, Inherit and Spread Mathematical Culture

College students are an important force for the country's future development and an important basis for China's strategy of strengthening the country through science and technology. Mathematical competition plays an important role in the cultivation of college students' scientific spirit and the dissemination of knowledge. Mathematics mathematical competition is an important form of integrating practical education inside and outside the classroom, and also an effective carrier to cultivate the scientific spirit of college students. Through the mathematics competition, the students' abstract thinking, logical thinking and innovative thinking ability are significantly improved. Due to students 'interest in mathematics, they will read mathematics extracurricular books. These books will introduce the discovery of mathematics, the relationship between mathematics and nature or other disciplines in a simple way, which can not only increase students' knowledge, but also optimize the mathematical knowledge structure they have learned, and also inherit and spread mathematical culture.

# 5.5 The Practical Effect of the Math Competition

In recent years, the has has great achievements in promoting the construction of courses and improving the mathematics ability. The number of students is increased year by year, from 26 to 104; the winning rate from 36% to 53%; the mathematics competition has reached nearly two thousand[9]. In the course of higher mathematics improvement class, there is often the phenomenon that students grab positions and occupy seats in advance. Mathematics competition flexibility and skill let students imagination and creativity, can mobilize the students' interest in learning, awards in the process of competition, get big satisfaction, at the same time also can influence and drive other students interest in mathematics, to form a good style of mathematics, is conducive to the development of mathematics competition and scale expansion[10].

#### 6. Conclusion

Mathematics competition can not only stimulate students 'interest in learning, but also exercise students' observation ability, attention ability, problem analysis ability and problem solving ability, but also can create a good learning atmosphere. Ordinary undergraduate colleges and universities are very suitable for the promotion of mathematics competition, which is a channel for ordinary undergraduate college students who fail in the college entrance examination, which is very conducive to their personal development in the future. Mathematics competition teaches students to find ideas to solve problems through extensive thinking, careful analysis and multi-angle exploration, cultivate rational scientific spirit and innovative quality, improve students' research ability, and let students constantly contact with and integrate into the mathematical culture in a subtle way.

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