Effect of Mathematical Modeling for Training Innovative Talents in the Independent Colleges
---Such as College of Light Industry Hebei Polytechnic University

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Abstract: College Expansion and the Independent Colleges of higher education were made by the increasing number of students. The traditional teaching meets the growing difficulties because the levels and requirements of learners. Independent school students’ ability and quality of training became the focus of teaching. This paper focuses on the mathematical model and the teaching practice emerged in the historical process. Mathematical model and analysis of the functions carried out the comprehensive capability to improve students, teachers and students in terms of innovation and personnel training. Finally, mathematics education considers the inherent requirements of the law and social practice, and was made to explore. Mathematical Modeling of Independent Colleges of education is an effective way to cultivate innovative talents.

Keywords: independent colleges, mathematical modeling, creative talents

As "National Education Policy of Mass" of the implementation and expansion of enrollment in the end of the century, it is making ordinary engineering colleges with lower admission scores. Although the independent Institute of running short of time, but its vitality and enthusiasm of a general educational force in higher education, its personnel training objectives for the Qualified Personnel. Different levels of students, their learning attitude very different learning purposes, so teaching can not then the original model, of which suffer the most should be the mathematics teaching. China's colleges and universities face in the 21st century knowledge of the mutual penetration of various doors and update the situation, and comprehensively improve the quality of our manpower needs; the role of mathematics will become increasingly important. So the independent college students mathematical application consciousness and overall quality of teaching and how to develop mathematical modeling contest, has become the independent Institute of applied talents facing major problems.

Since 2007, College of Light Industry Hebei Polytechnic University began to team up in the CUMCM (China Undergraduate Mathematical Contest in Modeling). The last three years, College of Light Industry get the national prize of one and the second prize of five and nearly 30 provincial awards. Since 2008, College of Light Industry participates in the MCM (Mathematical Contest in Modeling). The last three years, the Meritorious of three, the honorable mention of two. Interdisciplinary, independent college personnel as the main objective characteristics to mathematical modeling contest as the starting point, of the Independent Institute of Mathematical Modeling Contest mode of education and a careful exploration and summary, accumulated some experience.

1. Mathematical modeling profile

Mathematical Modeling Mathematical modeling is the focus for all students of the teaching and practice. Teaching the teachers the existing models or to explain material to enable students to understand some mathematical modeling methods and steps, the initial capacity of a certain mathematical model can be under the guidance of the teacher, simply imitate the establishment of a number of mathematical models; The practice is the real swords and spears (and can not do without the guidance of teachers) to engage in the activities of mathematical modeling, such as participating in group activities, mathematical modeling, targeted to find some practical issues (subject to moderate difficulty) to mathematical modeling, may also participate at all levels of mathematical modeling contest and so on. Mathematical modeling of the teaching and practice are mutually complementary, mutually reinforcing, interactions, and thus make mathematical modeling education into a virtuous cycle, which ultimately College Students analyze and solve problem solving skills, and create ability purposes.
MCM in the inaugural race in 1985 when 70 universities in the United States had 90 teams participate; our students are to participate in the United States since 1989 MCM's. In 1992 by the Society of Industrial and Applied Mathematics (CSIAM) organized by the State Education Commission Higher Education after the Reform Division and the China Industrial and Applied Mathematics Institute co-sponsored by the National College for the National Undergraduate Mathematical Contest in Modeling CUMCM (China Undergraduate Mathematical Contest in Modeling) have gradually carried up. Its purpose is to motivate students to learn mathematics enthusiasm and increase students to develop mathematical models and computer technology to solve practical problems, comprehensive capabilities and innovation of students and co-consciousness has now become the national Students for a year Session one of the four science and technology competitions. Application of mathematical modeling has strong competition (see Figure 1), the title of greater flexibility for participants to play their creativity. Participants should be based on questions asked in three days, the complete article, including model assumptions, establishing and solving the design calculation methods and computer implementation, the results of the analysis and testing, model improvement, etc. papers. Competition awards to reasonableness of the assumptions, modeling creativity, expression of the results of accuracy and clarity of the text as the main criteria.

Mathematical model is for a particular object for a specific target, under inherent laws specific to make the necessary of the simplifying assumptions, using proper mathematical tools and obtained a mathematical structure. Mathematical structure can be mathematical formulas, algorithms, tables, icons and so on. The question then solve the mathematical and interpretation of this result and verification. Otherwise it will return to re-assume the problem to improve. Mathematical structure can be mathematical formulas, algorithms, tables, icons and so on. Mathematical modeling is the mathematical model is a mathematical model of the process is the process of mathematical modeling (see Figure 2). Mathematical modeling is a mathematical way of thinking, is to use mathematical language and methods of abstract, simplified set up to approximate characterization and "solve" the practical problems of a powerful mathematical tool. Its students to study and work in the future will undoubtedly have a profound impact, while the ability of students also made it a higher demand.
2. Mathematical modeling ability of education to the students

This is the mathematical modeling of the most significant education on the role of higher education. Generally speaking, mathematical modeling is conducive to the overall quality of the student knowledge and training to enhance the practical ability and operational skills. Can be embodied in the five students:

①It can improve the ability of logical thinking and abstract thinking ability.
Logical thinking capabilities include: analysis, reasoning, arguments, judgments, conclusions and so the use of capacity; and abstract thinking skills include: analysis, synthesis, generalization, induction, extraction capacity. Mathematical modeling is the modeling, solution and analysis process. Modelings understand from concrete to abstract the process of thinking through the analysis of the perceptual knowledge to rational knowledge increased, this process will help improve students’ abstract thinking ability.

②It help to improve collaboration between students.
In the process of mathematical modeling, the mathematical model needs a large number of interdisciplinary, integrated with multi-disciplinary knowledge to solve. Mathematical modeling training and competition so that students consult with each other in the learning process, unity and cooperation, exchange ideas, solve problems together, making the knowledge structure complement each other, learn from each other. Modern science needs solidarity and cooperation of team spirit, this ability, quality training for their scientific research has laid a good foundation.

③It develop an integrated analysis of the problem students and the ability to solve practical problems.
Mathematical model is a positive thinking activities and including both logical thinking. but also non-logical thinking, the modeling process to go through the analysis and synthesis in general, abstract and summary, comparison and analogy, a systematic and concrete stage. Mathematical model from the test solution, requiring students learned math knowledge and computer knowledge, there are other areas of knowledge together, hands to solve, according to calculations made by a reasonable explanation. Through practice, apply their knowledge to improve the analysis, synthesis and solve practical problems.

④It help improve the students creativity.
Mathematical modeling is through a large number of interesting examples to stimulate student interest and enthusiasm to guide students to access new knowledge, new methods and new technologies to use in analyzing the problem, access to knowledge, ideas and solve problems presented during the Innovation student awareness and creativity. Teachers and students in solving practical problems a variety of learning activities in an effort to raise some innovative ideas and methods, bearing in mind the accumulation of knowledge of training and development of innovative capacity.

⑤It helps to strengthen the independence of college student self-confidence.
Independent College students lack a solid basis for learning as a lack of confidence. The mathematical model solves real problems start and guide students to take the initiative to study relevant courses. In the competition before the summer, college students will be competed together for a period of intensive training over a month, mainly as follows: the basic elements of strengthening the mathematical modeling; computer programming and software use; successive tournament title Simulation and thesis writing.

Through training, all students learn from each other, mutual exchange, mutual penetration of various disciplines, greatly expand the student knowledge widely. In mathematical modeling activities, the main role of students is full play. They mobilize their positive factors, to enable students to solve practical problems using mathematical ability to greatly improve. At the same time, also improved the application of mathematics software and computer capacity, learning self-confidence is enhanced. Past award recipients to the other students to model our efforts in attracting more learning involved in modeling, enhanced collective self-confidence and sense of honor.

3. Mathematical modeling education on the training of teachers
Mathematical Modeling of the teachers made a special request. That is professional quality; teachers should have a higher theoretical level in addition to, but also has strong practical ability, that is, to teachers of theory and practice of model-based combination of talents. Succeed in building a mathematical model of the practical problems and ideas and methods of teaching the students, not only requires teachers to have a strong mathematical basis, rational thinking training, also called teacher should have a keen insight, analysis capabilities and induction depth understanding of practical problems and extensive knowledge, especially in today's rapidly developing economy, mathematical modeling has not just from the mathematics to mathematics, but of physics, chemistry, biology, medicine, economics, management, ecology many other fields. Teachers engaged in teaching mathematical modeling must constantly expand their knowledge and reality, can make a difference. Moreover, mathematical modeling teaching profession in higher education settings, teaching reform of higher education also provides a good idea. Mathematical model of higher education and actively organize students to participate in modeling contest, help the development of higher education, help students hands-on capabilities. Institute of Light Industry is through mathematical modeling instructor for several years to students of mathematical modeling training, guidance, and gradually enriches the corresponding capacity. At the same time with the computer, the active cooperation of teachers of physics, applied mathematics to solve practical problems, made a series of scientific research over a number of reform issues and research projects, published papers in several academic journals.

4. Fostering creative talent by mathematical modeling

College is an important base for training personnel. And students should pay attention to the mathematical quality. Mathematics is a creative talent with high quality scientific and cultural quality of the important part is an important basis for innovation. Innovative thinking as a thinking quality and most modern students should have a quality. Innovative thinking, it is active, the original to find new things, to propose new ideas to solve new problems in a form of thinking, this is what we usually call "giving top priority." Innovative thinking is logical thinking, logical thinking and non-integrated. Creative thinking is a novel idea or unique way to identify problems and problem-solving way of thinking, is the outcome could lead to a variety of creative ways of thinking collectively. Innovative thinking include many of the specific way of thinking, such as analogical thinking, thinking backward, non-similar thinking, irrational thinking, convergent thinking, divergent thinking, etc. Mathematical modeling is to develop an effective way of innovative thinking, mathematical modeling teaching students the overall quality, innovation and education to the students, improve their creative ability and practical ability, promote and deepen the reform of university teaching important role. In recent years, the teaching of theory and practice have proved to be very clear, has formed a broad consensus both within and outside the education sector.

① Mathematical modeling can guide the students from passive recipients of knowledge into active participants and active explorers. Mathematical modeling can be used to organize students to question the thinking process for students through analysis, discussion of their own to find a solution to the problem. In the thinking process, students sprouted out of bits and pieces of creative consciousness, creative thinking and thus inspire the students of sparks.

② Mathematical modeling can enhance the teaching of mathematical thinking. Mathematical modeling of some mathematical concepts more than the actual background of the analysis of typical case, imperceptibly so that students master the mathematical ideas and methods, such as micro-element method, local linear, optimization, iterative approximation, transformation, etc.; also made to students insight and discovery, research and problem-solving methods of scientific thinking.

③ Mathematical modeling can enhance students’ learning ability. Mathematical modeling is to develop critical self-learning ability, in practice, we use the time between the questions for students to give full play to the students the background of the initiative, explore learning style, mathematical modeling to mobilize the enthusiasm of students, improve the ability of starting to a very good role, effective in
promoting self-learning capabilities.

5. Summary

Carried out in the independent colleges of higher education now, Mathematics as a specialized discipline, as one kind of natural and social scientific applications of the tool, teaching often focus only on passing its inherent laws, methods. It is difficult to estimate application in other disciplines of status so that mathematics education has been limited diversity. Mathematical modeling activities carried out today can see that mathematics education is to consider the inherent laws of mathematics, but also pay attention to the social practice of mathematics requirements. Mathematical Modeling of Independent Colleges of education should highlight the dominant position of students, teachers, teaching materials, all of the teaching methods, students should be learning services. Mathematical Modeling at different levels to promote, teachers should pay attention to the characteristics of independent college students to determine the requirements to adapt their teaching and quality of development goals. Number of education mathematical modeling thinking to full penetration. Mathematical thinking is the essence of mathematical knowledge is knowledge, skills, capabilities into a bridge, a powerful mathematical structure of the backbone. Modeling process should penetrate the ever-changing mathematical thinking to solve practical problems in the process, according to different practical problems in mathematical thinking infiltration. Institute of Light Industry to see this, mathematical modeling in education and extracurricular activities students integrate and cultivate a batch of high quality and innovative modeling talent. Modeling contestants in the graduate entrance exam achieve outstanding results. Most of the MCM and CUMCM players become the majority of a college campus style characters and light sub-celebrity Johnson. The mathematical model and innovative training institute for the goal to achieve fruitful results in the light industry, and promote the style of study and promote the teaching reform.

References