

# ***Research on Mathematics Teaching Innovation in Colleges and Universities Based on Mathematical Modeling***

**Su Xi**

*Xi'an Medical University, Shaanxi, China, 710021*

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**Abstract:** Mathematical application plays an irreplaceable role in various scientific fields, especially in engineering technology and economic management. Mathematics is the basic subject of nine-year compulsory education, which occupies a large proportion on quality education in China. Mathematics learning is undoubtedly very important for engineering college students. If the university mathematics teaching integrates the mathematical modeling thought, the student will be more convenient to study the abstruse mathematics question. This method can effectively improve the teaching efficiency and students' interest. This paper discusses the function and then it analysis the problems of mathematics teaching. Finally, the paper puts forward the innovative reform method of mathematics teaching.

## **1. Introduction**

The mathematics application is becoming more and more common in our daily life. Using mathematical methods to solve problems will become the development trend in the future. The efficiency of mathematics teaching in colleges and universities depends on students' interest in mathematics. Mathematical modeling can visualize and simplify mathematical problems. At the same time, the boring math class will become more vivid and interesting. It stimulates students' interest and improves learning efficiency and teaching quality. At present, the mathematical modeling development in colleges and universities has been well received. Whether in the achievement or the level of improvement of students, there are very big effect. Mathematical modeling, as a new teaching reform mode, has achieved fruitful results. Through holding the national college student modeling contest, the students' enthusiasm has been greatly improved.

## **2. The value of mathematical modeling thinking**

### **2.1 Change the pure theory situation in mathematics teaching**

The mathematical modeling application in the mathematics teaching reform has changed the traditional teaching mode, which transforms from a single theoretical knowledge into a teaching method combining theory with practice. At present, what the society needs is practical comprehensive talents, and the traditional teaching mode can't meet the needs of today's education

development. Mathematical modeling allows students to verify mathematical theories in the practice process. Mathematical modeling analysis can enhance students' mathematical practice and application ability. The teaching mode combining theory with practice will show greater teaching value.

## **2.2 Comprehensive understanding the practical value of mathematics**

The application of mathematical modeling in mathematics teaching can change students' learning attitude, and then deepen the students' cognition of the practical value. The combination of mathematical theory knowledge and life practice can stimulate students' interest in learning. Students can easily solve problems in life through mathematical modeling. In addition, through mathematical modeling knowledge, students can more comprehensively recognize the practical value on learning theoretical knowledge.

## **2.3 Deepen students' understanding of mathematical theory**

The traditional education mode is mainly based on theoretical knowledge, which is boring to learn. This hinders students' understanding of theoretical knowledge and affects their practical application ability. We should use mathematical modeling effectively in mathematics teaching. On the one hand, it can deepen students' cognition and understanding of theoretical knowledge. On the other hand, students can use mathematical calculation to solve some problems in life through mathematical modeling. In this calculation process, we need to follow the basic laws of information analysis, information hypothesis and so on. The practice application helps students deepen their understanding of theoretical knowledge.

## **2.4 Strengthen the fun of mathematics learning**

Mathematical modeling can strengthen the interest of mathematics and weaken its abstractness. Mathematics itself has strong abstractness and is difficult to understand, which leads some students to reject advanced mathematics learning. Mathematical modeling can express the abstract knowledge through calculation and analysis, which can make mathematics more objective and easier to understand. On the one hand, it effectively improves students' interest in mathematics learning and learning efficiency. On the other hand, it can improve students' ability of discrimination, analysis and innovation.

# **3. The problems in mathematics teaching**

## **3.1 The old teaching model**

Traditional teaching mode is a significant problem in mathematics teaching. Mathematics teaching in colleges and universities still adopts the traditional teaching mode of "teacher speaking and student listening". In this mode, the teacher is always the dominant role in the classroom, and students are subordinate status. Teachers can't effectively active classroom atmosphere, which caused the classroom depression. In addition, the teacher-centered teaching mode also represses students' personality, so the whole teaching activity is not strong. The obsolete teaching mode inhibits the active development of teaching, thus inhibiting the improvement of teaching quality.

## **3.2 Single teaching method**

Single teaching method is also a significant problem in mathematics teaching. In the current

mathematics teaching in colleges and universities, the main method is indoctrination. The teacher imparts mathematical theories to the students in class, and then the students understand and analyze by themselves. This kind of teaching method makes students lack necessary communication and discussion, so students' initiative is weak. Students' initiative is limited, so their learning and analytical ability cultivation will be affected. In addition, in mathematics teaching, the use of advanced scientific equipment and technology is not enough, such as information technology, multimedia technology, and so on.

### 3.3 Lack of teaching professionalism

The lack of teaching professionalism is another prominent problem in mathematics teaching. This problem is mainly reflected in two aspects. The first is the deficiency on professional construction in teaching team. In mathematics teaching in colleges and universities, teachers are an important guarantee for teaching quality. If the professionalism of the teaching team is defective, then students' learning will naturally be affected. So, it is great significance to analyze the professional defects and solve the problems of teaching. The second is the cultivating in students' professional thinking. In mathematics learning, the specialization of thinking is very important. With professional thinking, the depth and professionalism analysis will be significantly improved. However, at present, there are few cultivation on students' thinking major, so the lack of this aspect is serious.

## 4. The reform on mathematics teaching innovation in colleges and universities based on mathematical modeling

### 4.1 The construction of mathematical teaching innovation model

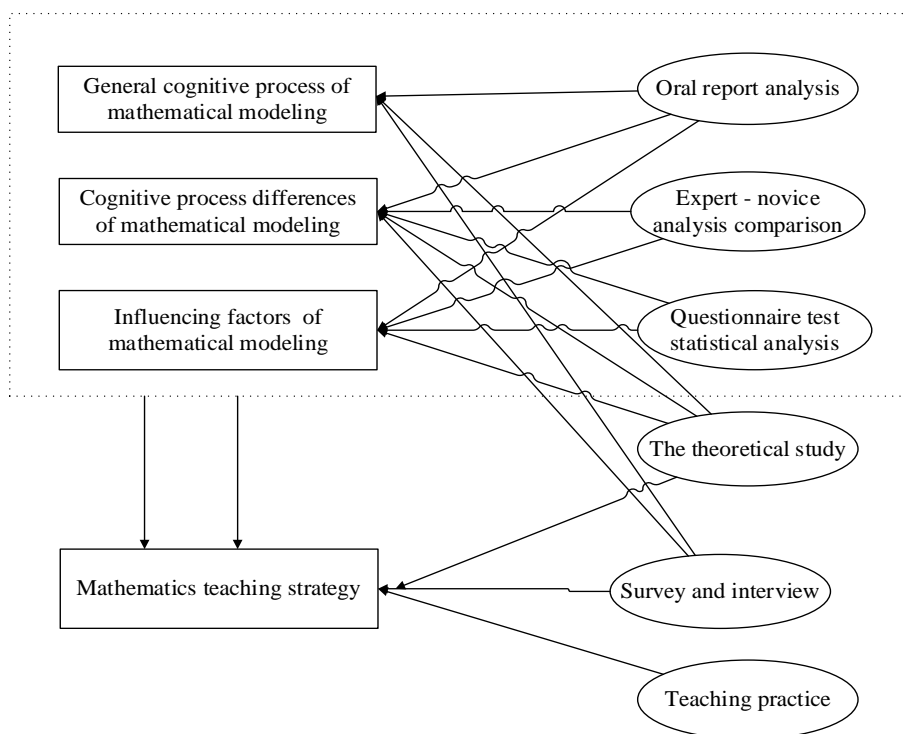


Figure 1: The construction of mathematical teaching innovation model

The construction of mathematical teaching innovation model is based on general cognitive

process, cognitive process differences, and influencing factors, and then study the teaching mode of mathematical modeling with various methods, such as oral report analysis, timely follow-up interviews, theoretical research methods, and so on. The construction of mathematical teaching innovation model is as the following figure 1.

## 4.2 Mathematical education combined with mathematical modeling methods

The teaching of mathematics major courses should focus on the combination with mathematical modeling in the university. Various mathematical models in mathematical modeling have appeared in various disciplines. How to make mathematical activities not repeated and simply classified is an important problem to be solved in mathematical modeling. Mathematics curriculum should be independent and unique. If it is reduced to the problem set generalization, it is easy to think that we are modeling for modeling mathematical education.

## 5. Conclusion

The mathematics education in colleges and universities should strengthen the application consciousness, and the reform also does not equal to the application plus the computer. Learning mathematics must be carried out step by step according to the laws. The key is to establish a virtuous circle of learning mathematics. After learning certain mathematics, students can have certain applications. We not only know that mathematics is useful, but also that our mathematical knowledge is not enough to solve practical problems through the application. The mathematics education reform must obtain the support of the students, teachers, experts and all aspects of the society.

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