

Exploration of Integrating Mathematical Modeling into the Reform of College Mathematics Teaching

Liu Yidi

City Institute, Dalian University of Technology, Liaoning, China, 116600

Keywords: Mathematical modeling; College mathematics teaching

Abstract: The importance of mathematics in social progress and economic development has been widely recognized. Therefore, how to cultivate students' application ability and improve students' comprehensive quality in the process of mathematics teaching is a problem that needs to be studied by college mathematics teachers. This paper expounds the present situation and existing problems of college mathematics education in our college, and analyses the connotation and significance of mathematical modeling, and the necessity of integrating the idea of mathematical modeling into college mathematics teaching. Finally, this paper puts forward concrete measures to promote the reform of college mathematics teaching by mathematical modeling.

1. Introduction

With the development of economy and society, there is a growing demand for talents with solid theoretical foundation knowledge and continuous learning ability. At the same time, there is a growing preference for compound talents with creative ability. The key to talent training is education, and the development of science and technology cannot be separated from mathematics as the basic support. Mathematics education occupies an important position in quality education, but the current mathematics education in Colleges and universities is too pursuing the perfection of theory and rigorous logic, so that the important role of mathematics discipline in higher education has not been brought into play, so that the trained students often only do mathematics, cannot learn for practical use, cannot give full play to students' thinking ability and problem-solving ability. Therefore, in order to fully meet the needs of talent cultivation under the new situation, we must reform the basic theoretical courses such as mathematics in domestic universities, combine mathematical modeling with the reform of College Mathematics teaching, and try to explore new ideas and new models of combining mathematical modeling education with training new applied talents. This is also the requirement of the times to cultivate students' practical application ability and innovative ability.

2. Necessity of integrating mathematical modeling into college mathematics teaching

2.1 Current situation of college mathematics teaching in China

College mathematics course is an important basic course in college of science and engineering.

At present, there are many contents in mathematics course. In order to complete the teaching progress, teachers lay particular stress on the explanation of theory and exercises in content processing, neglecting the background and application of mathematics, which makes students feel useless. In addition, in the actual teaching, many teachers have passed through the teaching of important concepts and theorems, failing to deeply teach the generation and thinking process of mathematical theorems and concepts. The explanation of classroom examples pays too much attention to the method of solving problems and lacks the guidance from one to the other, which causes students not to understand the use of the knowledge they have learned. Therefore, we cannot blindly pursue the explanation of mathematical theory and exercises, but neglect to integrate the idea and method of mathematical modeling into college mathematics teaching, which makes the value and goal of mathematics teaching not fully reflected.

2.2 The connotation and significance of mathematical modeling

Mathematical modeling is a process of describing and solving practical problems in mathematical language. Starting from practical problems, it abstracts them into mathematical problems by means of mathematical language, and uses reasonable mathematical methods to solve them, and then transforms them into solving, explaining and predicting real problems. As the basis of applied science, mathematical modeling can solve most of the practical problems of mathematics through the process of mathematical modeling. Mathematical model simulates the object of study by means of various rigorous, precise and scientific approaches. Therefore, it is a practical tool for finding and solving problems. With the development of mathematical modeling activities, the role of mathematical modeling has been widely recognized. Generally speaking, mathematical modeling plays an important role in cultivating students' abilities in five aspects as shown in Figure 1 below.

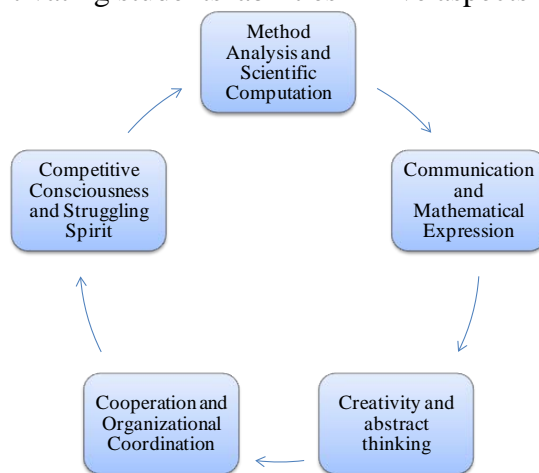


Figure1. Role of mathematical modeling in training students

2.3 Necessity of infiltrating mathematical modeling thought in mathematics teaching

Mathematical modeling is a bridge between mathematical knowledge and practical problems. Using the method of mathematical modeling to analyze and solve, the mathematical results of the solution are returned to the actual problem. Therefore, integrating the idea of mathematical modeling into university mathematics teaching, the foothold of the reform of mathematics teaching is to find the best combination of theory and practice, which is also the urgent requirement of current university mathematics education. The necessity of infiltrating the idea of mathematical modeling into mathematics teaching is shown in Table 1 below.

Table1. Necessity of infiltrating mathematical modeling thought into mathematics teaching

Contents	Details
Cultivating Innovative Talents	Mathematical Modeling is the Best Way to Train Students' Innovative Thinking and Ability
Reform of University Mathematics Teaching	Training Students' Innovation and Application Ability to Solve Practical Problems
Improving Comprehensive Ability	Broaden students' knowledge and cultivate students' scientific research ability

3. Strategies of integrating mathematical modeling into mathematics teaching

As a kind of quality education, mathematics teaching should not only connect with the outside world, but also train high-level talents with innovative ability in the era of highly informationized. Mathematics education is not only static teaching, but also the understanding of discipline spirit. Only by integrating mathematical modeling into college mathematics teaching, can students innovate in practical problems.

3.1 Infiltrating mathematical modeling thought into teaching content

Mathematics education should not only pay attention to the teaching of mathematical theory, but also to the cultivation of students' professional skills. In the process of integrating mathematical modeling into education, the content of mathematics curriculum should be perfected scientifically, and the abstract concepts in mathematical knowledge should be displayed by concrete examples. The main purpose is to emphasize the practical application of mathematics and guide students to use their knowledge to build mathematical models to solve problems, so as to cultivate students' mathematical modeling thinking. Emphasis should be placed on the application of knowledge rather than on theoretical deduction, especially on the proper abandonment of those complicated mathematical deduction and operation methods.

3.2 Solving practical problems with mathematical knowledge

After mastering the basic theorem of mathematical concepts, to further train students to solve practical problems with mathematical knowledge is actually mathematical modeling, that is, to transform practical problems into mathematical problems and solve them with mathematical methods, so as to enhance students' application of relevant knowledge and mobilize students' enthusiasm and autonomy in learning mathematics. To solve the practical problems related to life with the idea of mathematical modeling, students solve them by themselves and using the mathematical methods they have learned, which not only consolidates the knowledge of mathematics, improves the ability of applied mathematics, but also understands the importance of mathematics. Secondly, changing the form of examination, adding the practical problems that people are familiar with in life, and letting students establish mathematical models to solve them, can greatly improve students' ability to apply mathematics.

3.3 Changing the teaching mode with the guiding idea of mathematical modeling

Mathematics teaching is necessary to add elective courses about the operation of mathematical software. Through the study of these courses, students can really understand that mathematics can solve practical problems and lay a solid foundation for the follow-up professional courses. Secondly, under the guidance of the idea of mathematical modeling, we can change the way of examining

theoretical knowledge and computational ability in the past. Teachers give a certain number of mathematical questions in combination with students' majors, so that students can choose freely and submit the results within the prescribed time. This content accounts for a certain proportion of the test scores. Examination, as a way to test students' knowledge, is a guide for students' active learning. In such a teaching process, it can stimulate students' initiative and consciousness in learning mathematics, find cases related to the knowledge they have learned, and establish a simple mathematical model. In this way, students' learning attitude can be changed and their ability to analyze and deal with problems and apply mathematics can be trained.

4. Conclusions

Integrating mathematical modeling into college mathematics teaching is a new subject in the teaching and research of basic courses of College mathematics. Subconsciously integrating the idea of mathematical modeling in teaching can significantly improve the ability of college students to solve practical problems, strengthen their professional skills, and help students understand and grasp the contents and functions of mathematical knowledge more clearly. And cultivate students' team spirit, innovative thinking, analysis and mining ability and mathematical application ability, improve students' comprehensive quality, and train qualified talents needed by society.

References

- [1] Wu Dongqing. *Exploration the way of building mathematical modeling ability of undergraduates in local agricultural and forestry universities [J]. Modernization of Education, 2016, (1): 70-72.*
- [2] Zhang Jieming. *Research and practice of mathematics teaching reform in economics and management university of independent college [J]. Educational Theory and Practice, 2017, (37): 39-41.*
- [3] Sha Yuanxia. *The influence of mathematical modelling thought on College Students' mathematical application ability [J]. Journal of Jixi University, 2012, 12 (7): 10-11.*