

Practical Research on the Integration of Mathematical Modeling Thought into Function Teaching

Jixia Deng

Shandong Jiaotong University, Weihai, China

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Abstract: Through the joint study of theory and practice, this paper uses the method of literature review to understand the general situation of the development of mathematical modeling in China and abroad, and then discusses the role, steps and methods of integrating the idea of mathematical modeling into function teaching. Mathematical modeling has played a great role in students' interest in learning mathematics, mathematics learning methods, mathematical problem solving ideas and comprehensive practical ability. At the same time, it also analyses various factors that affect the development of mathematical modeling in middle schools. It is found that the main factors hindering the development of mathematical modeling in middle schools come from four aspects: teachers, students, parents and society.

1. Introduction

As the core of the model idea, mathematical modeling plays an important role in establishing the connection between mathematics and the outside world. By setting up mathematical modeling activities, students can not only learn mathematics actively and diversify, but also further stimulate students' curiosity about mathematics. It is also helpful for students to develop the habit of thinking actively and exploring independently.

As a new way of learning mathematics, mathematical modeling can provide students with the space of autonomous learning and cooperative learning, and help students feel the usefulness and significance of mathematics in solving the practical problems that middle school students encounter, and understand the relationship between mathematics and social life as well as various courses. As a classical model of problem solving, mathematical modeling emphasizes the process of problem analysis, problem hypothesis and abstract transformation, the application of mathematical tools, the selection of models and the process of model analysis, and the repeated process of model solving, testing, re-analysis, re-examination and re-solution. Students who participate in mathematical modeling activities can not only collect information through various channels, but also discover problems and put forward problems according to their own experience, give full play to their personalities and strengths, find solutions to problems from different angles and levels, experience the process of solving practical problems by using mathematical knowledge, enhance application awareness, improve practical ability and innovation ability. Power. It can be seen that mathematical modeling has become one of the important and basic contents of mathematics education at different levels.

In recent years, the exploration and practice of mathematical modeling in both universities and middle schools have shown that mathematical modeling not only meets the needs of social life, but also helps to stimulate students' interest in learning, enhance their awareness of application and expand their horizons. It is the best way for students to improve their mathematical quality.

2. Research on Integrating Modeling Thought into Number Teaching Practice

The teaching of mathematical modeling has been explored for many years in our country. The new curriculum standard has also included mathematical modeling in the compulsory content of students. However, the time of mathematical modeling entering middle school is not long. There are neither matching mathematical textbooks nor forming a complete mathematical modeling teaching

theory. Moreover, mathematical modeling is a very complicated process. Moreover, the ability of mathematical modeling is formed with the learning and practice of mathematical modeling, and with the understanding of mathematics and the broadening of knowledge, it is still difficult.

In order to integrate mathematical modeling into mathematics teaching, we can only cross the river by touching the stones. On the basis of previous explorations and on the basis of integrated teaching, I put forward some views on the idea of mathematical modeling drifting into function teaching. In my opinion, the idea of mathematical modeling should be integrated into the function teaching step by step. For this reason, I divide the whole higher education into H stages and integrate the idea of mathematical modeling into the function teaching step by step. At the same time, the integration of mathematical modeling ideas is carried out in the form of mathematical modeling in conventional classroom teaching, mathematical modeling provided by teachers, and mathematical modeling H for students' self-selected problems.

2.1 Mathematical Modeling Teaching in Conventional Classroom

Simply speaking, all mathematical concepts, mathematical formulas, equations, mathematical theory system and algorithm system can be called mathematical models, such as the analytical expression of exponential function and image is a mathematical model. This form of modeling mainly combines the content of the textbook with the selection of modeling topics, so that the problems in the textbook can be adapted to meet the requirements of modeling. Of course, some relatively simple modeling topics can also be selected after class to directly carry out modeling teaching, but it should conform to the cognitive characteristics of freshmen.

Mathematical modeling teaching in the regular classroom mainly focuses on freshmen, which is characterized by "simple modeling", that is, compiling some relatively simple examples combined with the content of textbooks, and establishing mathematical models by students and teachers to solve problems. It mainly cultivates students' interest in learning mathematics and raises students' application consciousness. In this stage of teaching, teachers can also imitate the process of modeling in practical problems to deal with the content of textbooks, so as to lay the foundation for students to use mathematical modeling to solve practical problems. _

2.2 Mathematical Modeling Teaching for Teachers Providing Questions

Teachers provide mathematical modeling of problems. Teachers select some real-life problems that meet students' learning level to provide students. Under the inspiration and guidance of teachers, the modeling group completes the process of model selection, establishment, calculation and validation. In the process of modeling, data need to be processed, which is bound to be inseparable from the use of computer software such as geometric footboards, matlab, Mathematica, so teachers should strengthen the guidance of students in this respect, paving the way for students to find the solution of the model.

The amount of knowledge of students is increasing gradually. After the teacher gives a question, the students discuss and communicate according to what they have learned, and then analyze and construct the model together with the teacher. The focus here is no longer the application of a certain knowledge point, but the application of the basic principles and methods of mathematics to find solutions to problems and improve the students' mathematical quality.

2.3 Mathematical Modeling Teaching of Students' Selective Problems

On the basis of the previous modeling, students have a certain level of modeling, at this time, they can enter the modeling stage of student-selected problems. At this stage, students are required to choose a practical problem, establish a mathematical model to solve the problem, and finally reflect their results in the form of small papers, according to their own modeling knowledge and experience. For the topic of modeling, teachers can know that students start from H aspects, such as the problems around them, parents' working environment, and relevant information on the Internet.

3. How to Incorporate Mathematical Modeling Thought into Functional Strategy Hall

Set obstacles between teaching content and students' psychology to create situations, so that students can reach the state of "indignation" and "dismay", and then introduce them into situations related to teaching. An important role in creating situations is to arouse students' interest in knowledge, science and life through situations. There are many ways to create situations, among which the most commonly used one is to create situations with practical problems. Creating situations with practical problems can enable students to experience mathematics firsthand, understand the universality of mathematics and mathematics everywhere in their lives, train students to explore things around and in society from the perspective of mathematics and mathematical thinking, and use mathematical thinking to consider problems.

3.1 It is an effective way to integrate the idea of modeling to let students explore problems by themselves.

Problem is the core of mathematics, and understanding the problem is the key to learn mathematics well. Let students start to explore the problem is the premise to solve the problem. Starting to explore the problem can also make students understand the essence of mathematical knowledge, make students feel that there is mathematics everywhere in life, and then produce thinking about mathematical modeling. Only by letting students explore problems by themselves can they really feel the joy of mathematics and the role of mathematics. They will really like mathematics from the bottom of their hearts. They will try to solve the problems encountered in real life with the mathematical knowledge they have learned. At this time, they will find the great role of modeling, and they will make real efforts to learn it well. In the classroom, by starting to explore the problem, students can actively think about the problem, in-depth study of the problem and consciously explore the problem, so that students gradually acquire the ability of mathematical modeling step by step. Students explore problems from multiple perspectives, multi-level and multi-level in peacetime, think more and think more when they encounter problems, and give them valuable mathematical qualities, which is also the ultimate goal of integrating modeling ideas into mathematics teaching.

3.2 Skillfully Using Variant Questions to Promote Students' Understanding of Functional Model

In mathematics learning, students often like to solve problems according to some habitual way of thinking, that is, what we call thinking stereotype, which has both positive side and negative side. When this kind of habitual thinking is consistent with the way of problem solving, it will accelerate the generation of positive migration so that problems can be solved quickly, and vice versa, it will produce negative migration, so that ideas can not be freed under a certain situation. The negative influence of thinking stereotype is either to lead students' thinking in the wrong direction or to cause students to think incorrectly, thus restricting the development of students' thinking, leading to problems that are ultimately puzzled. A large number of teaching practices have shown that thinking stereotypes are ubiquitous in teaching, and variant teaching is an important way to overcome this phenomenon.

Function teaching incorporating the idea of modeling can not be separated from examples and exercises. Therefore, in variant teaching, teachers should guide students to carry out multi-solution, multi-change, multi-use and multi-solution normalization training.

3.3 Design open questions in function teaching and cultivate mathematical modelling thinking

The ultimate goal of mathematics learning is practice. Teachers should explore textbooks deeply, explore the practical value of them, and make students develop the consciousness of applied mathematics. Therefore, the design of open questions is very important. The introduction of open questions is of great help to students' mathematical problem-solving strategies and divergent thinking. Only when students' problem-solving strategies are improved, can they better complete

the model calculation in the process of mathematical modeling. Similarly, students have divergent thinking, "can think more in the whole process of mathematical modeling, so that the solution of the model is closer to reality.

4. Setting up Modeling Special Course in Daily Function Teaching

4.1 Organizing extracurricular activities focusing on Modeling

Mathematics activity course is the key point to cultivate students'innovative thinking. For innovation, the new curriculum standard also gives a clear goal, only innovation can surpass. Mathematics is a rich and colorful science, a wide range of research fields, and a variety of activities. If applied to mathematical knowledge, it can not only broaden students'horizons, improve students' interest in learning, but also cultivate students'mathematical quality and practical ability. To improve the effect of mathematical activities, we abstract the practical problems encountered in social life and the problems encountered by students in learning into mathematical models by pursuing the origin and quantification, and compile mathematical modeling topics as materials of mathematical activities. In the activities, try to make every student move, in a happy atmosphere so that students understand mathematics, understand the ideas contained in mathematics, will use mathematical thinking. In short, organizing extracurricular activities of mathematical modeling will help to promote the classroom teaching of mathematical modeling in middle schools, so that students can develop the awareness of using mathematics and enhance their ability to solve mathematical problems.

4.2 Lecture on Mathematical Modeling

Mathematics originates from practice, serves practice but is higher than practice. The special lecture on mathematical modeling can help more teachers and students understand mathematical modeling and realize the role of mathematical modeling in teaching and practical life. Mathematical modeling is the best bridge between classroom knowledge and real life. For the problems encountered in real life, solving them through a series of processes of mathematical modeling is the charm of students'real feeling of mathematics. Of course, in order to complete this process, we need to have a solid mathematical foundation and modelling ideas. We need students to go out of the classroom, feel and use mathematical knowledge in life, and then get answers by hands-on operation. We need to take part in modelling activities in practice, cultivate students'awareness of mathematical application, the ability of integrating theory with practice, the ability of hands-on operation, and many excellent mathematical ideas.

References

- [1] Fu Jun, Zhu Hong and Wang Xianchang. Practice and Reflection on training students'innovative ability in mathematical modeling teaching. Journal of Mathematical Education, 2007.
- [2] Zhu Panhua. Refining the Thought of Mathematical Modeling from Textbooks. Journal of Mathematical Education, 2017
- [3] Dai Chaoshou, Sun Shiliang. Concise Course of Mathematical Modeling [M]. Higher Education Press, 2016.
- [4] Zhu Tiejun. Practical Research on Integrating Mathematical Modeling Thought into Analytic Geometry Teaching [D]. Changchun: Northeast Normal University, 2016.
- [5] Huang Cheng. Teaching Research on Mathematical Modeling under the Background of New Curriculum [D]. Shanghai Normal University, 2015
- [6] Sun Weiping. View of Social History in the Information Age [M]. Nanjing: Jiangsu People's Publishing House, 2010:8.
- [7] Wang Weiguang. New Popular Philosophy. 6. Thesis of Value [M]. Beijing: People's Press, China Social Science Press, 2014:116.