Research on College Mathematics Teaching Method Based on Modeling Thought

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Abstract. Nowadays, modeling ideas are more and more widely used in university mathematics teaching. Based on this, this paper mainly analyzes the necessity of infiltrating mathematical modeling ideas into college mathematics teaching and it also discussed college mathematics teaching methods based on modeling ideas.

Keywords: Modeling Thought, University Mathematics Teaching, Analysis

1. Introduction
With the globalization of the market economy and the rapid development of computer networks, it is widely spread in the field of mathematics. This is an important part of modern high technology and it has become the center of the development of the times. In the context of the new curriculum reform, university mathematics education will focus on the development of students’ analytical and applied techniques. This makes students adapt to new environments and new models better. It is also important for teachers to improve traditional application-level learning. Therefore, we must integrate mathematical modeling into university mathematics education [1].

2. Overview of modeling ideas
Mathematical modeling is to build mathematical models based on the problems encountered in daily life, and use the role of computers to solve numerical values. When applying modeling ideas, the usual steps include: Before building a model, the leader needs to have a deep understanding of the social level and internal mechanism of the problem to be solved, and then conduct extensive research on the problem and deepen the research; the leader is in When you fully understand the relationship between the key elements of the problem to be solved and each element, you need to transform the mathematical problem of the problem and simplify it appropriately; apply the basic mathematical knowledge to the problem, and build the model under the mathematical structure; The key role of the computer and the application of related software to obtain model solutions; after analyzing the mathematical model, the model needs to be tested. In the actual application of mathematical models, not all models can be consistent with objective reality, so the authenticity and scientificity must be tested when modeling; after the test is completed, the unscientific parts need to be improved and the variables modified. Models and other content to ensure the rationality of the factors in the model; play the role of mathematical models in life [2].
3. Significance of modeling ideas in university mathematics teaching
In college mathematics teaching, it is necessary to strengthen the cultivation of students' sense of innovation and the improvement of overall quality, and cultivate students' modeling thinking, which can not only strengthen students' ability to apply mathematical knowledge, but also significantly improve the quality and efficiency of problem solving. In my country's current university education, teachers should understand that teaching is not only to teach students mathematical knowledge, but also to cultivate students' practical ability to apply knowledge to practical problems. In the past teaching under the teacher model, the mathematics classroom atmosphere is relatively dull, and the students are not very motivated. Strengthening the application of modeling ideas can effectively improve this phenomenon. Specific functions include: creating an active atmosphere and increasing interest for students. The whole process of modeling thinking from practical problems to theoretical knowledge and then to practice can significantly increase student participation, and guide students to master mathematical knowledge, ideas, and language, and promote the formation of mathematical concepts and the application of theoretical knowledge [3]. In addition, through modeling, the originally boring mathematical knowledge can be transformed into positive and vivid events, and a variety of subject knowledge can be included to improve the learning process; strengthen the cultivation of students' innovative thinking. In our country’s previous indoctrination education for examinations, students have very limited time for independent thinking and understanding of knowledge, their thinking is gradually solidified, and innovative thinking is insufficient. Applying modeling ideas can promote students to participate in raising and hypothetical questions, specifying letters, mathematical modeling, and model solving. It can not only help students consolidate the theoretical knowledge they have learned, but also divergent thinking and innovative thinking.

4. The status quo and problems of college mathematics teaching

4.1. Low teaching quality
In the process of mathematics teaching in most universities, mathematics is conducted in the form of public courses, which makes advanced mathematics and other mathematics courses with higher requirements for science and engineering unable to target the corresponding professional teaching. Students' knowledge of mathematics is limited to the theoretical mastery, and there is no corresponding concept of how to combine with the college physics, circuit, analog electronic technology and other higher mathematics courses. This makes it necessary to provide supplementary explanations on the corresponding mathematics knowledge in the future professional course teaching, which not only brings trouble to the professional course teacher, but also makes the students unable to understand the application background of mathematics knowledge for the first time. The low teaching quality is also manifested in the low requirements for students' math knowledge and skills assessment. Not only do the math test questions originate from after-school exercises or homework questions, but also involve less difficult and comprehensive questions, and the requirements for too low mathematics assessment are further increased. It helps students learn mathematics [4].

4.2. The teaching content is boring
The single and outdated teaching method is a common problem in mathematics teaching in various colleges and universities. Due to the limitation of class time, not only can teachers not only briefly introduce the historical and cultural background and application results of mathematical knowledge, but also shorten the time for writing on the blackboard as much as possible. The content that needs writing on the blackboard is moved to the PPT. This kind of graffiti teaching with formulas and theorems can hardly stimulate students' interest in mathematics, nor can it arouse students' thinking about the application of mathematics, making mathematics knowledge limited to a kind of cognition, rather than a kind of mastery of skills.

4.3. Low frequency of mathematics applications
In mathematics teaching, the frequency of investigation of students' mathematics skills is also very low, only requiring students to complete mathematics homework, and almost no teaching investigation for each chapter. The low assessment frequency prevents students from discovering their lack of knowledge in mathematics in time. When the accumulation reaches a certain level, the loopholes that students need to improve and make up in mathematics knowledge will hinder students from further learning. Many students are struggling to learn in professional courses because of the lack of solid foundation in mathematics [5]. In the course of circuit analysis and other mathematics skills requiring extremely strong teachers' teaching steps, they eventually lose interest in learning, which is great for students and society loss.

5. The necessity of infiltrating mathematical modeling ideas in mathematics teaching
The traditional mathematics classroom only pays attention to the study of theoretical knowledge, but ignores the cultivation of students' innovative consciousness and application ability. Mathematical modeling is different from traditional mathematics courses. Mathematical modeling is to transform students' professional knowledge into the ability to solve real problems, focusing on cultivating students' innovative practical ability and creative thinking, and is the link between students' theoretical knowledge and application ability. Mathematical modeling refers to the process of constructing a mathematical model. In layman's terms, a mathematical model can be understood as, for a given specific problem, according to the peculiar laws of the thing itself, in order to get a reasonable result, so as to do something about the problem. Simplify the assumptions boldly, and then use appropriate mathematical methods to get a mathematical model that can be solved [6]. The general process of mathematical modeling is shown in Figure 1:

![Figure 1. The general process of mathematical modeling](image)

It can be seen that mathematical modeling is to allow students to abstract mathematical models from actual situations, then use mathematical knowledge to solve the models, and finally return to a process of exploration, discovery, analysis and problem-solving of actual problems. It is a bridge between practical problems and theoretical knowledge of mathematics, can connect and communicate theoretical knowledge between different disciplines, and enable students to apply what they have learned. This shows that the integration of mathematical.

6. College mathematics teaching methods based on modeling ideas
There are three aspects of college mathematics teaching methods based on modeling ideas as shown in Figure 2:

**Figure 2.** University mathematics teaching method based on modeling ideas

### 6.1. Update teaching content

In the current university mathematics teaching, it is necessary to reformulate the syllabus, update the content of mathematics teaching, and add some teaching links, including mathematical experiments and mathematical modeling. Specifically, it includes: on the basis of the main body of the current curriculum, integrating modeling ideas and modeling methods into concepts, proving theorems, and arranging examples. Therefore, teachers need to dig deeper into the problems applicable to mathematical modeling in the classroom, integrate them with mathematical modeling, and gradually form mathematical ideas. Using this method can not only deepen students' understanding of modeling ideas, but also experience the actual effect of modeling methods; attach importance to experimental classes [7]. The addition of experimental courses can improve students' modeling, practice, and computing abilities. For example, on the basis of not affecting the teaching of theoretical knowledge, present cases suitable for mathematical modeling to students, use appropriate mathematical software to draw graphics, and perform corresponding operations; in order to more in-depth popularize modeling ideas, it is necessary to increase extracurricular practice. The proportion of activities. Including the establishment of modeling elective courses, interest groups, modeling research associations, etc.

### 6.2. Optimize teaching methods

In order to strengthen the guiding role of modeling ideas for university mathematics, it is necessary to further optimize the teaching methods, recognize the drawbacks of the previous teaching methods, change the traditional model of teachers in charge of lectures and students only need to listen, and conduct in-depth exploration of teaching purposes. Transform the teaching of traditional theoretical knowledge into ability teaching and development education. In addition, there is a need to increase the diversity of teaching methods. Specifically include: attach importance to the student's dominant position, let students discover, explore and solve problems independently. For example, when teachers explain theorems and mathematical formulas, they should not directly tell the results. They need to base themselves on actual problems and require students to use observation and analysis, guessing, and summarizing methods to find ways to solve the problem; add cases. Through the problems that can be seen everywhere in life, the concept is drawn. In teaching, use cases that are closely related to life to help students realize the role of mathematical theoretical knowledge and model building. For example, when explaining definite integrals, teachers cannot teach step by step, but need to ask some questions that can stimulate students to think, and then ask students to establish mathematical models, elicit knowledge of definite integrals, and let students know that modeling methods can Other problems include the application of irregular figure area calculation; strengthening the application of modern multimedia technology [8,9]. When explaining some non-intuitive and relatively abstract knowledge, including curve graphics, etc., the application of multimedia technology can not only simplify the modeling steps, but also improve classroom efficiency.
6.3. Use of applied tasks
The exercise questions in the current textbooks tend to be computational, which is not conducive to cultivating students' ability to solve practical problems. In the application of modeling ideas, it is necessary to increase the proportion of application-oriented tasks. For example, if several objects have a weight of 1, and the weight of a single object is unknown, analyze the relationship between the vector \( \mathbf{w} \) formed by the weight of a single object and the matrix \( \mathbf{a} \). Transform it into actual problems, combine matrix knowledge, and analyze it in an orderly manner to improve students' ability to use knowledge [10].

7. Conclusion
In summary, it has become an inevitable trend to integrate mathematical modeling ideas into university mathematics teaching. Introducing modeling ideas will lead university mathematics education to a new level. Of course, there are still hidden dangers and problems that need to be faced in the specific implementation process. This needs to be explored and researched by the teaching staff.

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