

# *Practice and Application of Modeling Thought in Higher Vocational Mathematics Teaching*

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**Abstract:** As a subject closely related to thinking logic and creative level, mathematics plays an increasingly important role in higher vocational education. The exploration of mathematics teaching methods in higher vocational colleges has also entered a new stage. However, compared with ordinary colleges and universities, the foundation of students in higher vocational colleges is relatively weak, so it is necessary to gradually improve the context of mathematical knowledge and promote the internalization of mathematical knowledge based on the construction of specific mathematical ideas. Based on this demand, it is necessary to consider the penetration and application of modeling ideas in higher vocational mathematics teaching. On the basis of strengthening the construction of students' mathematical knowledge framework, it helps students break through the constraints of superficial understanding and realize the cultivation of deep application ability.

## **1. Basic Understanding of Mathematical Modeling Ideas**

The idea of mathematical modeling usually refers to the use of mathematical theories and tools to establish corresponding mathematical models in the process of solving problems in the real world. Essentially, this model is actually a mathematical construct. The mathematical structure here can not only be some mathematical formulas, but also exist in the form of some kind of graphic table. Its main purpose is to help people gain a deeper understanding of the properties and states of real objects, and to speculate on the future status of objects, so as to provide reference for people's decision-making and control schemes when dealing with things.

The idea of mathematical modeling is of great significance to the teaching of mathematics in higher vocational colleges. It is first reflected in stimulating students' interest in learning. The foundation of vocational students is relatively poor. When they study mathematics, they are often confused by the meaning of mathematics learning. In addition, mathematics requires higher logical thinking ability, and the classroom is more serious and boring. Many students have difficulty in understanding mathematical theory and cannot improve their interest in learning mathematics. Mathematical modeling thought is a kind of applied mathematical thought. Through the application of modeling ideas, the teaching of mathematical theory can lead to many concrete examples. This

combination of mathematics teaching and real life can not only make students clear the meaning of mathematics application, but also effectively stimulate students' interest and enthusiasm in learning mathematics. On the other hand, the idea of mathematical modeling is an important way to solve problems with mathematical knowledge closely related to life. The integration of higher vocational teaching and mathematics teaching is highly unified with higher vocational mathematics teaching goals.

## **2. The Practical Path of Applying Modeling Ideas to Higher Vocational Mathematics Teaching**

### **2.1 Applying Modeling Ideas in Knowledge Import**

The traditional teaching method of higher mathematics starts from definitions, concepts and axioms. After repeated demonstration and reasoning, teachers obtain corresponding mathematical formulas, theorems or methods, and then explain how to apply them. This interpretation process often makes students lack the purpose of learning. If the teaching process is reversed, directly starting from actual cases, and introducing or eliciting relevant theories and methods by solving practical problems, the pertinence of lectures can be greatly improved and good results can be achieved. In fact, using real and specific cases to reveal the general law of integrity can effectively stimulate students' interest. For example, from the perspective of "response" to embody the meaning of the function. For example : each employee will "correspond" to a salary; each student will "correspond" to a student number; each student will "correspond" to a score after each test; each real number will "correspond" to a cubic number ...so that students' understanding of the concept of functions can be deepened.

In addition, we should also pay attention to the selection of cases so that students can easily understand and accept them. The mathematical knowledge involved in the case should be what the students have learned or are learning, and the difficulty should not be too high. Generally, some simple numerical processing procedures can be used.

### **2.2 Combining the Elements of Life Mathematics, in-Depth Modeling Case Core**

As a course closely related to many elements in life, mathematics can use the original realistic cognition as a channel to deepen conceptual understanding and cognition, both in terms of theoretical construction and practical application. Especially in the process of modeling education, it is necessary to further combine the research of life mathematics elements, pay attention to the actual situation in the process of case selection, and achieve the teaching effect of getting twice the result with half the effort. The injection of modeling thinking in the mathematics classroom of higher vocational education needs to be based on a reliable model. Therefore, when designing a teaching plan for mathematical modeling, teachers can use the mathematical elements of life related to practical problems as a carrier to extract mathematical models from specific cases, so as to achieve the teaching goal of in-depth analysis of the core and essence of cases.

example, teachers can first guide students to try to extract and list common mathematical elements in life, and divide them into corresponding categories, so that they can be easily selected and applied in the teaching of different chapters and sections. Taking common taxation issues as an example, students can conduct in-depth analysis based on the calculation of housing loan compound interest and the differences in consumption channels, find out the relevant issues about the "taxation" element, and extend it as an independent mathematical modeling case. Through this

process, on the one hand, students can be guided to actively form a mathematical modeling awareness in their daily life, so as to further explore the application of modeling ideas in mathematics learning; Invisibly master the skills of modeling thinking and lay the foundation for the subsequent mathematics learning process.

### **2.3 Optimize and Reorganize the Conceptual Structure, and Improve the Content Expansion Layer by Layer**

The value of mathematical modeling thought in the process of mathematics teaching is not only reflected in the direction of problem solving, but also in the construction and consolidation of the mathematical knowledge system and structure. Based on the objective differences between higher vocational students and ordinary college students on the basis of mathematics , the idea of modeling is used to break, optimize and reorganize the existing content structure, so that the drawbacks of the original teaching model under organizational efficiency can be fully exposed to the system Teachers can also improve the original content framework layer by layer along this context, and complete the degree construction on the existing basis. Generally speaking, the modeling idea is hidden in the mathematical knowledge system in an implicit state. In order to make it have a clear state in the content structure reorganization, it is necessary to further combine the specific mathematical foundation of higher vocational students, integrate the professional direction and development needs, and promote the construction of a diversified teaching mode on the basis of refining the ideological context.

For example, in the teaching of differential equations, teachers can first divide the content structure according to the professional direction of students, so that the construction of the teaching framework is more targeted. For example, when teaching mechanical students, materials such as steel can be added to the content setting, resulting in temperature control problems, requiring students to observe the change process during the professional learning process; when teaching electrical majors, problems such as RLC circuit analysis can be added Content settings and attempt to apply mathematical modeling and computational results to professional problem solving. Through this process, on the one hand, the relationship between mathematical modeling thinking and practical problem processing can be further connected, and the training path of students' modeling thinking can be broadened; It really affects the lives of students.

### **2.4 Clarify the Importance of Mathematical Modeling Ideas and Cultivate Students' Awareness of the Application of Mathematical Modeling Ideas**

Compared with traditional teaching, higher vocational mathematics teaching practice should focus on improving students' effective understanding of the importance of mathematical modeling ideas while mastering basic mathematical knowledge and skills, and taking mathematical modeling ideas as an example to deepen students' understanding of mathematical modeling. Cultivate students' awareness of the application of mathematical modeling thinking. In the practice of mathematics teaching in higher vocational colleges, there are many problems in the thinking of mathematical modeling in the teaching process. Through the use of cases, teachers can promote the effective integration of course teaching plan and mathematical modeling thinking, improve students' understanding of the application of mathematical modeling thinking, and cultivate students' modeling awareness. For example, a teacher asked: If someone wants to buy a piece of land on the island, but the island owner only wants to sell a piece of land that can raise cowhide at a high price, how can the closed land area reach the highest value? When solving these problems, the teacher's

first step is to guide the students to actively explore how to cut the cowhide into thin strips and tie long ropes , and then use the natural boundary of the coastline, and then ask the students to design corresponding graphics and compare and calculate each number. In this process, the core of the modeling is based on the given perimeter, and the figure area is the largest. By making consecutive selections, students can conclude that the area of the figure is greatest when the perimeters are equal. Through the construction and solution practice of mathematical models, on the one hand, it can cultivate students' ability to think independently and solve problems, on the other hand, it can cultivate students' cognitive and application ability of mathematical modeling thinking.

### 3. Conclusion

To sum up, the idea of modeling in mathematics learning affects the direction of individual logical context and the construction of knowledge framework to a large extent, and plays an important supporting role in the mathematics learning of higher vocational students. However, in order to promote the in-depth integration of modeling thinking and higher vocational mathematics teaching, it is necessary to identify teaching points based on the actual needs of students, and take teaching practice as the premise, so that modeling thinking can play a better guiding role and promote higher vocational mathematics teaching. To comprehensively improve the quality of higher vocational mathematics teaching.

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