
HOW TO GIVE VITALITY TO COLLEGE MATHEMATICS CURRICULUM IN CLASSROOM TEACHING

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ABSTRACT

College mathematics has a high degree of abstraction, strict logic and wide application. How to use effective teaching methods and methods to give full play to the role of students' active learning is the key to the teaching of college mathematics. From the aspects of mathematical concept, teaching content, teaching method and teaching process, this paper expounds how to make the college mathematics teaching "live", fully mobilize the enthusiasm of students' study, so as to improve the teaching quality of the mathematics course.

KEYWORDS: College mathematics; Course Teaching; Case Teaching Method; ability training; Teaching Quality

Mathematics is not only a scientific language and tool and the essential foundation of many science and technology, but also a broad and profound science. It is also an advanced culture. It has been playing an important role and influence in the process of human cognition and the transformation of the world. The college mathematics series course is a very important basic course for the students of science and engineering, which not only lays an essential foundation for the follow-up courses, but also plays an important role in cultivating the students' thinking logic ability, improving the students' ability to analyze and solving problems. In order to improve the teaching quality of college mathematics curriculum, many schools have introduced a series of measures and systems in teaching management, which is undoubtedly of great effect to students, but these are "external causes" after all. From the point of view of teachers, the key to improving the quality of teaching is to pay attention to ways and methods in teaching, to stimulate the enthusiasm of the students, to explore the potential of "internal cause", and to turn the students from "want me to learn" to "I want to learn", so as to achieve the purpose of improving the quality of teaching. How to mobilize the enthusiasm of students to improve the quality of mathematics teaching?

1. Case teaching method of driving problem, "Live" the concept of Mathematics

University mathematics curriculum is highly abstract, mainly reflected in the abstraction of definitions and theorems. However, its concepts, ideas, theories and methods are not "the pure 'creation and imagination of freedom of the human spirit," and that the objective world has nothing to do with it; "on the contrary, nature provides the original form of all the imaginations" (Engels). If the relation between mathematics and the outside world is cut off, the relation between mathematics and real life is cut off, and the mathematics will become a passive water from the concept to the concept, from the formula to the formula. The teaching of mathematics will inevitably be boring and undynamic, and the knowledge imparted can not be thorough and impossible. It is impossible for

students to realize the requirements of mathematics teaching by inspiring their mathematical thinking and spiritual essence. Therefore, if the definition and theorem of mathematics are introduced directly, the students will feel very abstract and difficult to understand. Therefore, it is necessary to change the traditional way of teaching from the definition and concept meaning. Before the introduction of each concept, starting with the application case of mathematical knowledge, through the study of the case, the introduction of the concept is clear, the abstraction of mathematical concepts is weakened, and the mystical sense and strangeness of mathematics are eliminated.

For example, when introducing the concept of derivative of function, it is usually first to discuss two practical problems: one is the slope of smooth curve, and the two is the problem of a straight motion, a variable force and a work under the action of variable force. Through the discussion of the two practical problems, the expressions of the slope of the tangent line and the work of the variable force are obtained respectively. The common characteristic of the two expressions is the limit of the increment of the function value and the increment ratio of the corresponding independent variable, which leads to the definition of the derivative of the function.

For example again, when teaching infinite series, students can discuss infinite sums and differential operations.

$$1-1+1-1+1-1+\dots$$

The student union will make some suggestions and get the following two results:

$$(1-1)+(1-1)+(1-1)+\dots=0 \text{ or } 1-(1+1)-(1+1)-\dots=1$$

This derives the wrong conclusion $0=1$. This suggests that there are essential differences between students and limited and infinite ones, and at the same time stimulate students' desire to learn from series.

Teachers use case teaching methods to introduce new concepts and new knowledge, from shallow to deep and image analysis to eliminate the abstractness of mathematical concepts, to make students feel the nature of concept introduced, to the new concept of "perceptual knowledge", and to stimulate students' interest in the learning of mathematics course.

2. Make rational use of modern media technology to make teaching methods "alive"

In the course of teaching, according to the characteristics of teaching content, through the design of teaching technology, rational selection and use of modern media technology, such as mathematical software and teaching courseware, and combining with traditional teaching methods, using the teaching process, forming a reasonable teaching structure to achieve the optimal teaching effect.

The rational use of teaching courseware can increase the amount of information in the classroom and the vivid degree of teaching content, make the image vivid and flexible, make the teaching cases

"move", make the teaching mode static and dynamic, make the abstract problem visualize, and the traditional way of teaching can give students more understanding and thinking space. Thus, the organic combination of modern teaching methods and traditional teaching methods can not only enrich the content of classroom teaching, but also help students to produce positive emotions, stimulate students' interest in learning, give full play to the subjectivity and enthusiasm of the students, activate the classroom teaching atmosphere, and make the students learn knowledge in a happy life. Therefore, improving the efficiency and effectiveness of classroom teaching and ensuring the improvement of mathematics teaching quality.

3. The development history of mathematics makes teaching content live

Bacon said well, "history makes people wise." The mirror of history can reflect the footprints of scientific development, so that we can better understand the past, understand the present and think about the future. The history of mathematics has not only the research on the discovery and development of mathematical theorems, axioms and important mathematical ideas, but also the ways of the internal development of each branch of mathematics, the subjective and objective reasons for the mathematical achievements and the biographies of the mathematicians. The existing mathematical teaching materials always give a complete theoretical system to create a kind of impression that mathematicians naturally give from definitions to theorems, theorems to inferences and so on. The whole derivation process will not encounter any difficulties, and students are drowned in strings of definitions, theorems and formulas. After reading the history of mathematics, we can realize that the mathematical proof is also defective and the mathematics needs to be developed. All the definitions and theorems have its objective factors. The introduction of definition and the proof of the theorem have considerable methods and techniques. Understanding the history of mathematics can help students grasp the true meaning of mathematics, broaden the way of solving problems, and enhance the innovative ability of mathematics. At the same time, we can get inspiration and encouragement from mathematicians' thinking methods and frustrations. We will gain insights and even stimulate students' courage to tackle problems. Of course, they do not agree with every student to read the history of mathematics, but as a math teacher, at least the history of mathematics should be understood. It is necessary to improve the consciousness of "methodology" teaching, strengthen the teaching of mathematical methodology, and display the process of definition, theorem producing and proving to students, so that students can taste the "original process" and get "twice the result of half the effort" The effect of training the students' creative ability.

4. The teaching method of teacher-student interaction makes the teaching process "alive"

Mathematics is not a descriptive subject, but a reasoning discipline. It is not a spectator subject, but a thinking discipline. To learn mathematics well, it is far from enough to rely solely on teachers to talk freely and perfectly. Teaching process is a common activity between teachers and students. Teachers should be in the leading position, but they should not replace them. They must mobilize the students' enthusiasm for learning, guide their students to move their brains and become passive and take the

lead in their study. We all have such experience, some class teachers speak clearly, it seems that there is no difficulty in understanding, so that students review and work less work after class, so that students do not learn well. Therefore, in the course of mathematics teaching, teachers should leave full space for students to think, and after putting forward questions, they should inspire and induce students to think out their own conclusions, instead of putting the conclusions to the students. The implementation of the "heuristic" teaching method requires teachers to first understand the students, familiar with the students' professional characteristics, basic knowledge, understanding ability and the overall level of the basic situation, so as to determine the starting point of the teaching, the depth and teaching content of the depth and breadth, to achieve a definite target. Encourage students to express their opinions so that students can speak freely and express their opinions. After explaining a theorem, proof or a relatively complete part of the content, ask if the students have problems or not understand the place, give students a chance to ask questions, let the students change from passive learning to active learning, maximize the potential of students and stimulate students' desire for knowledge. Only by doing so can we cultivate innovative talents who are not stick to the rules and are full of pioneering spirit.

If we adopt the heuristic teaching method, we should design the link of classroom teaching in advance. For example, the introduction of new knowledge, from an intuitive example to the students from specific to abstract, from the special to the general, from the analysis of the conditions and conclusions and the internal relations, enlightens the students to bear fruit, from the cause to fruit; from two aspects of positive and negative examples, guide students to understand the connotation of important concepts and so on. At the same time, teachers are required to analyze the contents of textbooks in a multi-level, multi lateral and multi angle way, so as to enable students to understand and understand each other better. For example, the main contents of the differential mean value theorem are the Rolle theorem, the Lagrange mean value theorem, the Cauchy mean value theorem and the Taylor mean value theorem. The teaching content can be taught with the help of the strong geometric meaning so that the students can understand and master it, and further point out the special and general relationship between them, so that the students can accommodate them. It is easy to grasp the different conclusions under different conditions; finally, guide the students to understand the common characteristics of the mean value theorem of the above series, which reflect the relationship between the difference of the function value of the function in a certain interval and the derivative of a point within the interval. Of course, the scientific teaching method is not only reflected in the students' knowledge of the textbooks, but also the ability to analyze and solve problems and to solve practical problems with mathematical knowledge.

5. Expanding the teaching content appropriately so that the content can be "live"

In the course of teaching, teachers should expand the scope of teaching content properly according to the content of teaching, broaden the thinking of students' thinking and improve the students' ability to raise one's back.

For example, in the course of linear algebra, the general textbooks systematically introduce the determination, structure and solution of the solution of linear equations $Ax = b$, and briefly introduce the method of solving the elementary transformation of the matrix equation $AX = C$. When the matrix A is reversible, by using the method of using the elementary transformation

$$[A \ B] \xrightarrow{\text{Elementary Row Transformation}} [E \ X]$$

we can find an unknown matrix X .

Here we can extend the solution of matrix equation to $AXB = C$, when A, B are invertible It can also be solved by the following elementary transformation method :

$$\begin{bmatrix} A & C \\ 0 & B \end{bmatrix} \xrightarrow{\substack{\text{Elementary Row Transformation for A} \\ \text{Elementary Rank Transformation for B}}} \begin{bmatrix} E & X \\ 0 & E \end{bmatrix},$$

So we can find the matrix X . Next, we can further guide students to think: when there is at least one irreversibility in A, B , how do we solve the matrix equation $AXB = C$? In this way, the teaching content has been expanded and the space for students to continue learning and thinking has been left. Through this teaching method, it can cultivate students' ability of analyzing problems, strict logic thinking ability, knowledge application ability and innovation ability, so that students' comprehensive ability can be greatly improved.

6. Take the "lead out" teaching method to make the course content "live"

In the course of teaching, after teaching a relatively independent part of a course, for example, in the end of a section or a theorem proving, the teacher should make a summary, review the theorem and its whole proof, grasp the key link, reunderstand the conditions and conclusions of the content or theorem, and examine the perfection of the proof of the content or theorem. Body structure, straighten out the relationship between content or related knowledge before and after the theorem. In the same way, after the whole content of a course is finished, the knowledge should be summed up so that the content will be hierarchical and systematized, and the knowledge is refined. To lead the students to the "outside" of the course content, that is, to "take out" the students, to eliminate the phenomenon of "not knowing the true face of Mount Lu, only in this mountain", to open the trees, overlook the forest, to understand and master the knowledge at a higher angle.

How to get the students to "get out" is another key step after taking the students in - to get out, to help them jump out of the book mountain question sea, to "outside", to summarize the content of the study, to reunderstand the perfect overall structure of the knowledge, and to let the students think consciously: what's inside this part of learning Rong, what is the most fundamental content, and so on, and so forth. These steps are better on the basis of the students' own review, and the teachers will

make a systematic summary of them so that students can realize that the most fundamental is the most important and the key.

For example, after learning the definition of derivative and the law of calculation, the derivative is used as a tool to study the monotonicity, concavity and convexity, extreme value, maximum value, function drawing, tangent of curve and normal equation, physical application and other geometric applications. It seems to have a lot of content, but if the definition and understanding are thorough, the formula and rules are accurate and the whole content is listed, the contents are thinner, varied and simple, and the students get out of the difficult situation easily and happily. For example, the definite integral, the integral, the curvilinear integral and the curved area in the integral calculus are all four segments of the definition, which are divided, replaced (approximations), summation and limit, and these concepts can be completely unified. As for their application, the key problem is the "element method". After students have mastered the "element method", it is geometrically: the area of the plane or space figures and the volume of arbitrary geometry. In physics, the gravity, mass of the mass of particles, the moment of inertia and so on will be popularized in physics. In Mechanics: the coordinates of the barycenter of an object of any shape can be obtained.

7. Summary

All the concepts of the mathematics course are abstracted from practice, and are promoted into theory by research and then applied to practice in order to achieve the perfect unity of abstractness, accuracy and wide application. It is this unity that makes students have a sense of mystery and strangeness towards university mathematics, which leads students to be afraid of learning or even to learn. This is actually a misunderstanding. As a teacher, we should soberly realize that eliminating this misunderstanding is an important prerequisite for leading students into the university mathematics hall. Therefore, the mathematics teacher should always treat the teaching work with strict and serious attitude, and pursue higher teaching effect and teaching quality as the teaching behavior criterion; carefully prepare and take each class well, use modern teaching means rationally, deeply study the teaching method, establish the relationship of mutual trust between teachers and students, and build a harmonious study. Atmosphere; know what the students think, understand what the students want, release students' doubts. With a high degree of responsibility, we should strive to improve their teaching level, improve their teaching methods, be careful about teaching, and enthusiastically put into teaching reform, conscientiously practice and keep forging ahead, together with everyone to create new brilliance of mathematics education in China's colleges and universities.

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