Study on self-regulated learning strategy of higher mathematics

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Abstract: In view of the problems existing in the teaching and learning of higher mathematics, this paper mainly discusses the improvement of teaching methods, the all-round provision of teaching resources, the change of teaching forms and the teaching management, and discusses how to construct the self-regulated learning strategy of higher mathematics.

1. Introduction

For students in school, the most important thing is learning to learn which is necessary to have a certain learning methods and strategies, for teachers, it should try to improve the level of students' learning methods and strategies, training students to be able to learn independently is an important task of teaching work. The learning method of higher mathematics is the means or approach for students to complete the learning task of higher mathematics, and is the basic activity mode and guiding ideology adopted by students in the process of acquiring knowledge, mastering technology and forming skills.

2. Renew teaching ideas

To cultivate students' independent learning ability, we must create the best atmosphere for students to learn independently.

2.1 Building a warm classroom

The change of modern educational concept emphasizes the emotional communication between teachers and students, and the appropriate body language of teachers is conducive to adjust the teaching atmosphere and creating a warm teaching environment. In the teaching, the student often regards the teacher's smile as a kind of reward and encouragement which lets the student feel the teacher is respectable lovable, and causes the student to enter the study condition with the best subject spirit.

2.2 Constructing a class with hierarchical teaching

To cultivate students' consciousness of self-regulated learning, we should let them experience the joy of success. Teachers could put forward suitable task and requirements according to the individual differences of students, could try the layered teaching, create different levels of situation to let the student participate actively, create opportunity for them to show their talent, timely find the best in them, give them affirmation and praise as much as possible, so that make them develop confidence in the continually success, stir up their pursuit of success and participate in the study actively.

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2.3 Constructing the classroom with sufficient thinking space and time

It takes time and space to think and explore. In classroom teaching, teachers should be good at creating blank for students' behavior and thinking, that is trying to leave students enough time and space, so that they have opportunities to participate in the observation, operation, thinking and discussion initiatively, and find a way to solve the problem in doing and thinking.

2.4 Constructing the classroom of students' independent practice

Through the activities that students like to see and hear, students can personally experience that there is mathematics everywhere in life. Mathematical knowledge can be used to solve practical problems in life and explore new knowledge with what they have learned. In teaching, teachers should create activity environment according to students' psychological characteristics, provide students with opportunities to operate and practice, and transform Abstract knowledge into perceptual content.

2.5 Constructing the classroom of classroom of cooperative inquiry

Cooperative learning is one of the important ways for students to learn independently. It is a group discussion and exchange under the leading role of teachers. Students learn to help each other in cooperative learning to realize learning complementarity, enhance cooperative spirit, and promote learning progress and intellectual development. Teachers should strive to create a democratic and harmonious teaching atmosphere, stimulate students' internal needs, teach students the methods of self-learning, and enable students to effectively participate in the whole process of cognition, so as to cultivate students' innovative spirit and practical ability.

3. Creating problem situation

American educational psychologist Jerome Seymour Bruner pointed out that the best stimulation of learning is the interest in what has been learned. Once a person becomes interested in a problem, his efforts will reach a surprising degree. However, students' interest in learning is not innate and needs to be guided and stimulated. In mathematics teaching, the creation of situation is a necessary condition to stimulate students' self-regulated learning.

The materials and background provided by higher mathematics textbooks, especially the establishment of mathematical models, come from the forefront of scientific and technological development, as well as from the colorful natural environment, which is closely related to students' actual life and the accumulation of original knowledge, which provides unique conditions for the creation of problem scenarios in teaching. The problem situations shown in mathematics teaching can be directly drawn from the examples around, but also some perceptual materials such as mathematical models, pictures and objects. The teaching of higher mathematics should be based on problem solving, and provide students with problems that can not only reflect the knowledge they have learned, but also relate to the existing knowledge of students. For example, in teaching Lagrange's mean value theorem, we designed a series of problems on how to construct auxiliary functions. First, we guided students to think and discuss whether Lagrange's mean value theorem can construct auxiliary functions by other methods besides geometric methods. On the basis of whether can prompt from the conclusion, recursive method is used for a function, make the function in that the derivative of the value of the mean value theorem is the conclusion, finally guide the student to construct the auxiliary function was generalized in fact is a special type of reverse analysis conclusion, thus it improved the students' understanding of structural method.

4. Teaching learning strategies

Learning strategy of higher mathematics refers to learners' understanding of learning tasks and conditions, selection and use of learning methods, and regulation of learning steps and processes in order to achieve certain learning objectives in specific learning situations. It mainly includes selective attention strategy, perception strategy, memory strategy, thinking strategy, practice strategy,

review and consolidation strategy, regulation strategy and resource management strategy.

In the present higher mathematics teaching, compared with the general higher mathematics knowledge technical skill teaching, the study method and the strategy teaching is still in the relatively weak position. There are two kinds of defects in the mastery of students' self-regulated learning methods and strategies. One defect is students do not have the corresponding learning methods and strategies; the other is the applied defect, that is, students already have the ability, but do not activate and extract the corresponding methods and strategies in a timely and effective manner when needed. Therefore, we should regard learning methods and strategies of higher mathematics as a very important teaching objective, which can be taught to students through the following ways:

4.1 Infiltrating learning methods and strategies into daily teaching

The most appropriate method of teaching higher mathematics learning strategies is to permeate in the daily teaching, it first could be through demonstration, free play, full display the usage of mathematics learning strategies by teachers, to a certain stage could be tried to discuss, try and practice using these learning methods and strategies by the students, in this way, it both completed mathematics teaching specific content and tasks, and made the students mastered the corresponding mathematics learning methods and strategies.

4.2 Holding special lectures on learning methods and strategies

In order to make students master the basic learning methods and strategies of higher mathematics systematically, it is necessary to set up special lectures. It can be a special lecture given by the teacher himself to the students, or some experts and scholars can be invited to have a discussion with the students. Learning method lecture should pay attention to the highlight as the followings: A. Clarifying the meaning and function of the learning method to students, making them understand learning method is the important conditions of learning and learning well. B. The lecture should be targeted, and meet the needs and practical learning of students. C. Lecture should have flexibility, and be considered when to speak, what to speak, speak to whom, and what degree it comes to, etc.

4.3 Provide students with opportunities and conditions to use mathematical learning methods and strategies flexibly

The key to provide students with opportunities and conditions to use mathematical learning methods and strategies flexibly is to create learning activity situations and flexibly deal with students' learning performance in the process of mathematical teaching according to the requirements of teaching and students' characteristics. Teachers should understand their students, and if conditions permit, they can provide students with specific guidance on learning methods and strategies.

5. Strengthening mathematical modeling

Problem solving is the ultimate goal of mathematics teaching process. The important task of higher mathematics teaching is to improve students' ability to master knowledge and skills, which are mainly manifested in calculation ability, logical thinking ability and spatial imagination ability. Not only that, to improve students' mathematical ability, we must pay attention to the teaching of mathematical activities, should encourage students to use mathematics to solve problems, as well as to explore some problems of mathematics itself, to cultivate students' mathematical modeling ability and data processing ability, strengthen the education of using mathematics. For example, when talking about probability, the teacher raised the possibility of winning the first prize in a football lottery. The students would be very interested in it.

6. Reform teaching mode

In recent years, higher mathematics education in Chinese colleges and universities has been

reforming, involving many aspects, such as syllabus, content and teaching methods, but it still fails to attract students. In my opinion, the most fundamental problem is that most of our teachers' teaching concepts are too old and the teaching model is too backward.

The traditional teaching mode is teacher-centered lecturing, which is not conducive to students' independent learning. In this teaching mode, students' learning revolves around teachers' teaching, and students have few opportunities for independent learning. Therefore, in order to promote students' independent learning, it is necessary to reform the teacher-centered teaching mode, respect students' autonomy, and change the basic teaching order from teaching first to learning first. That is to say, it should let students solve the learning content what students can master through self-study and discussion, and then the teacher focus on the explanation or guidance of the content students can not master. This kind of teaching procedure may be the determing study goal, stimulating study motive, students learning material content by themselves, the self-study examination, organizing discussion, teachers focus on explaining, practice and consolidation, the classroom summary. Teaching in accordance with this basic teaching procedure could better promote students' independent learning, which truly reflects the educational thought of learning-oriented and learning-guided teaching.

7. Using evaluation appropriately

The evaluation of students' independent learning must take students as the starting point and adhere to the people-oriented development evaluation. The evaluation criteria, methods and results all play important roles in the active development of students. In the evaluation, it is no longer a single evaluation of teachers, but a combination of self-evaluation, others' evaluation, group evaluation and teacher evaluation, quantitative and qualitative evaluation, process evaluation and final evaluation. Evaluation should focus on the overall development of students, pay attention to individual differences, pay attention to encouraging evaluation, let every student have a successful experience, could be self-development. Evaluation is only a means to promote the development of students' independent learning.

Scientific evaluation and feedback is the enhancement of self-regulated learning of higher mathematics. In the process of higher mathematics learning, the ultimate goal of evaluation is not only to identify effective learning, but also to maximize the value of mathematics learning. Through evaluation activities, teachers and students can obtain more information feedback, regulate teaching activities, and stimulate students' achievement awareness and desire for knowledge. The evaluation of higher mathematics teaching should start from the learning of mathematics itself, and warmly encourage students to question and raise questions, and to express different opinions, so that students have a sense of psychological security, and students' opinions should be adopted the strategy of delaying judgment, not rushing to comment on the advantages and disadvantages, and arbitrary negation is strictly prohibited. In the process of mathematical homework, experiment and the discussion of mathematical problems, the inspiration of students' discovery and creation will often appear. Students should be guided to be original, and give encouraging evaluation to the shining point of thinking as much as possible.

8. Conclusion

Conducting self-regulated teaching in higher mathematics teaching reform has a sufficient theoretical basis, the practice of the elementary education reform provides the corresponding theoretical basis of developing self-regulated teaching of higher mathematics. Based on this, as long as we continue to pursue and improve the corresponding theory and believe that the self-regulated higher mathematics teaching reform must have greater progress on changing the traditional teaching mode and the establishment of the new teaching mode and idea, and has important practical significance and practical value on promoting the teaching reform of colleges and universities in other aspect.

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