# Study on Higher Mathematics Teaching Reform of Normal Universities and Colleges

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**Keywords:** Higher Mathematics; Normal Universities; Teaching Reform

**Abstract:** Higher mathematics course is a crucial basic course in colleges and universities, which plays an important role in the development of students. As a special group of institutions of higher learning, normal universities are widely distributed and are the main training base for teachers and educational researchers. In order to improve the comprehensive quality of talents, under the current education system in China, it is of great significance to train teachers with good mathematical quality in normal universities to promote the implementation of quality education in China. Taking Fujian Normal University as an example, this paper investigates and studies the current situation of higher mathematics teaching in Fujian Normal University by means of questionnaire and interview. On the other hand, by summarizing the characteristics of normal universities and combining the teaching experience, some effective suggestions are put forward for the teaching of higher mathematics in normal universities.

## 1. Introduction

Mathematician Gauss once said, "mathematics is the queen of natural science". "Mathematics is an important basic discipline, which has irreplaceable functions in cultivating college students' practical ability and innovative consciousness". Higher mathematics is a basic course for non-mathematics undergraduates, including students of science and engineering, economics and even arts. As a special group of institutions of higher learning, normal universities are widely distributed and are the main training base for teachers and educational researchers. In order to improve the comprehensive quality of talents, under the current education system in China, it is of great significance to train teachers with good mathematical quality in normal universities to promote the implementation of quality education in China.

Mathematics, as the key to science, influences the learning and thinking training of subsequent professional courses, and determines the level of scientific talents in the long run[1]. With the development of the society, the former education mode, teaching content and teaching methods are no longer suitable for contemporary students. Therefore, education reform is imperative.Of course, the reform is not achieved overnight. We need to learn from the successful experience at home and abroad, and find out a suitable teaching method for China at present. Since the 1980s, major universities in China have been carrying out teaching reform involving various disciplines, majors and courses, which is still in progress[2].

Higher mathematics teaching quality, directly affects the student to the subsequent course of study, also directly affects the quality of student learning. But in the minds of many students, mathematics is abstract and hard to understand. It is useless. Aiming at this phenomenon, this paper makes a preliminary discussion on how to reform the traditional mathematical teaching mode in normal universities and train students' ability to apply mathematics.

## 2. Current Situation of Higher Mathematics Teaching

First of all, the textbooks are simple. The textbooks we use now are basically traditional advanced mathematics textbooks, which focus on classical theory and simple calculation. There is

no certain system. This has led to many students finishing ask the question: what is the use of studying this course? What practical problems can be solved? This leads to the second problem, students lack enthusiasm, initiative. Some students think: It is not necessary for them to study higher mathematics. They think mathematics is too abstract, difficult, not interesting, not attractive. Spending too much energy on the aspects of one's own weakness will inevitably have a depressing effect on one's own talent and will become a kind of bondage.

Thirdly, teaching methods are single and teachers lack of teaching skills, often using the teaching method, focusing on the logic of the rigor. The teaching objects of higher mathematics are mostly freshmen, who have not yet fully adapted to the learning pace of universities. Instilling teaching content over and over again can make some students feel like "a head-on blow" and very tired. At the beginning, students are confused and lost the interest and confidence to continue learning higher mathematics, forming a vicious circle[3].

## 3. Some Reform Measures

According to the characteristics of normal universities, the direction of reform is to help students to lay a solid foundation, mobilize the enthusiasm of the classroom, impart mathematical thoughts and conduct teaching according to the positioning of students. Explore and try the following countermeasures:

### 3.1. Adjust and Optimize the Teaching Content and System to Improve Students' Interest and Enthusiasm in Learning Advanced Mathematics

The introduction of stories, which are about mathematicians' discoveries and explorations of new knowledge, can add to the discipline's sense of history[4]. At present, higher mathematics teaching mainly focuses on teaching mathematical knowledge and its application. Students who are from normal universities, should also be familiar with mathematical methodology, mathematical philosophy, mathematical history, mathematical culture and so on. In this process, students can not only like mathematics, but also open up their horizons, which is conducive to the cultivation of divergent thinking and comprehensive ability, so that students have more space for independent development, and can be more comfortable in the future primary mathematics education.

A successful mathematics education should not only provide students with necessary mathematics knowledge, but also train students with necessary rational thinking. In the teaching of higher mathematics, we should strengthen students' understanding of concepts and theorems. Mathematics is a very logical science. The description of concepts and rules must be strict, and all conclusions must be strictly demonstrated. Therefore, mathematics does not require rote memorization, but requires a deep understanding of the connotation of the concept. Only in this way can students truly master the knowledge of higher mathematics[5]. Therefore, we should also add the content of mathematical thoughts and methods in the classroom, show the thinking process in the classroom, and let students understand "how to think it out", rather than simply memorize it by rote.

Mathematics is concerned with logical thinking and the basic elements of thinking are mathematical concepts, which are the generalization and reflection of the essential attributes of some things and phenomena. Such the understanding of concept is the key to affect the teaching effect. Combined with the unity of abstract theory and realistic background, introducing new concepts and related theorems intuitively becomes an effective teaching method to improve students' accepting ability .In the course of teaching mathematics, teachers should not only pay attention to the explanation of difficult points, but also pay attention to the intuitive teaching, from concrete to abstract, from special to general, so that students can deeply understand the knowledge and master it. In teaching, concepts, which can be intuitively introduced, should better be introduced intuitively through geometric figures and practical problems. The teacher can give one or two similar examples, and then summarize them. Regardless of their practical significance, the teacher can abstract the commonness of mathematics and sublimate it into a theory.This is helpful for students to deepen their understanding of concepts and theorems[6].

### 3.2. Strengthen the Construction of Teaching Staff

Normal colleges and universities undertake the main task of national teacher training. The key to improve the quality of education lies in teachers, who are the executors of teaching. Their professional level has a direct impact on what they can "teach students" and "how to teach", which is related to all aspects of the future development of the country. The training of teachers in normal universities should not only focus on the training of subject knowledge, but also on the training of education professional knowledge, highlighting the necessity of education major. In particular, teachers who teach higher mathematics courses should not only learn the basic knowledge of pedagogy and psychology, but also understand the number Learning methodology, mathematical philosophy, mathematical history and mathematical culture, etc. It is important for normal students not to be able to recite several formulas and do several problems, but to know the origin and use of these theorem formulas, that is, to solve the problem of "what" rather than "what"[3]. Only if they can establish a relatively complete knowledge system and master mathematical ideas, can they better teach their students.

### 3.3. Reform Teaching Methods and Methods

Traditional mathematics teaching is that teachers use blackboard and chalk, from concept explanation to theorem proof to examples, exercises, emphasis on deductive reasoning training and a variety of calculation skills, or in order to catch up with the progress of just a rough introduction of the formula and conclusion, teaching students to mechanically apply the formula[7]. This way of teaching makes students accept mathematics knowledge passively, and students will feel that mathematics is boring, so they lose the interest and motivation to learn mathematics. Therefore, the traditional teaching methods and teaching methods are not conducive to students' interest in learning and creative thinking must be reformed.

With the popularization and development of computers, it provide certain conditions for teaching innovation. Multimedia teaching is not only intuitive and vivid, but also can greatly increase the information of each class and improve teaching efficiency. For example, in the explanation of definite integral, the process of solving the area of curved trapezoid is displayed dynamically with the help of multimedia teaching, so that students can understand and master the concept of definite integral.

In terms of teaching methods, we can adopt the combination of exploration, heuristic and discussion. For example, the teaching process of introduction is an important embodiment of heuristic teaching method. In the introduction class, the teacher can put forward some practical problems that the students are interested in, which can be used as the wedge of the whole course and left to be solved one by one later. The teacher can even string the whole teaching content together with several key problems, so as to play the effect of the outline and the echo[8]. At the same time, we should set up several questions in the classroom for students and return the class to students, then let students find the process or method of solving problems through effective cooperation, communication, exploration and query within a given time[9]. When students solve a problem, they will have a sense of achievement and increase their interest in learning.

## 4. Conclusion

Higher mathematics is one of the core courses designated by the State Education Commission, and it is the most important basic course. It is not only related to the study of various professional courses, but also plays an indispensable role in cultivating the ideological and cultural quality of college students. Hence every college student should learn it well. The reform can't be completed by one person. It needs to arouse the enthusiasm of mathematics teachers. Only with the joint participation of teachers and students, the cooperation of school leaders at all levels and relevant functional departments, can the reform proceed smoothly. But it has a long way to go. It needs to go through the baptism of time, continue to explore and correct, and finally realize the mutual development of teaching and learning.

**Acknowledgements**

The author would like to thank all the editors. The research was funded by Teaching Reform Funding 'Study on Teaching Contents and Methods of Higher Mathematics C in Our University' granted by Fujian Normal University 2017.

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