

## Research on the Reform Path of Higher Mathematics Teaching Method Based on the Embedding of Mathematics History

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**Keywords:** History of Mathematics; Higher Mathematics; Courses; Teaching

**Abstract:** It is imperative to reform the teaching of higher mathematics. It is an effective method to add the history of Mathematics under the condition of stabilizing the basic content. This paper probes into the infiltration of mathematics history education into higher mathematics teaching. This paper expounds the significance and function of the history of mathematics in Higher Mathematics teaching. According to the investigation and research, the teaching design integrating the concept of mathematics history is given, and the effect is tested in the classroom. The purpose is to provide reference and reference for teachers to integrate mathematics history into the mathematics teaching curriculum. Studies have shown that the history of mathematics is not only a magical moral education textbook, but also greatly stimulates students' sense of mission to learn advanced mathematics and enhances the interest and motivation of higher mathematics learning. The cultural role of mathematics development, the application of the development of mathematics, and the full play of the educational function of the history of mathematics.

### 1. Introduction

The training goal of the school is to train skilled and practical talents for the grass-roots level and the first line of production. In terms of personnel training, we should adhere to the "ability-centered" training model. Mathematics is the basis of all science and technology. The organic combination of history of mathematics and mathematics education has become a hot issue of mathematics education in the world [1]. Poincare, a famous French mathematician, once said, "If we want to foresee the future of mathematics, the correct way is to study its history and current situation. The core of the new round of curriculum reform is to pay attention to the development of students. In the curriculum standard, the goal requirements of emotional attitude and value dimension are also put forward [2]. Not only should we focus on the results, but also on the process. Teaching should focus on the development of students rather than just on disciplines. Therefore, the traditional teaching methods need to be improved, and the penetration of mathematics history in teaching is a way to promote the overall development of students [3]. And it has correspondingly caused reforms in teaching methods, teaching content, curriculum system, examination methods, teaching evaluation, teaching material construction, teaching management, etc [4]. All teachers, students and managers of higher education institutions must actively face the reform of higher education teaching in this new century. In the process of learning, students only passively accept theorems, formulas, and laws. Many times they do not understand the ins and outs of these "mathematical achievements," and the teaching effect is greatly reduced. At this time, if the relevant mathematics history content can be added in time, the students will understand the background, production process and application value of the mathematical theorem, which will play an unexpected role in improving the teaching effect [5].

Modern curriculum concept advocates the concept of dynamic, open and reflective curriculum, which has a certain guiding significance for the construction of curriculum in Colleges and universities in China. In the course of the construction of higher mathematics curriculum, we boldly draw lessons from and absorb some advanced teaching achievements at home and abroad, and study the "dual-subject", "interactive" and "hierarchical" teaching mode which is suitable for the training objectives of applied talents [6]. Only when educators attach importance to it will educatees attach importance to it. We must abandon the mistaken idea that mathematics is formula, theorem, law and

sea-question tactics, and fundamentally change the curriculum structure, curriculum content and evaluation methods of higher mathematics [7]. Make mathematics an integral part of the advanced mathematics curriculum. A large number of mathematical methods are widely used in various production fields [8]. Visualization of theoretical problems, simplification of complex problems, from easy to difficult, from simple to complex, from concrete to Abstract. If the difficulty is too concentrated, it should adopt a method of distracting the difficulties and breaking each. Facing the new situation, the reform of mathematics curriculum in higher vocational colleges should focus on the perspective of mathematics education on students' ability and quality training, and teach students to use mathematics' position, viewpoints and methods to observe problems, analyze problems and solve problems [9]. Many students who enter colleges and universities still have a lot of problems when they study the content of advanced mathematics calculus. The main reason is that there are some misunderstandings in high school derivative learning. Therefore, simply teaching mathematics and neglecting the history of mathematics cannot achieve the teaching effect expected by the new curriculum reform. The history of mathematics can effectively promote students' mathematics learning, especially the study of mathematical concepts, and promote the development of students. This paper studies the reform path of higher mathematics teaching methods implanted in the history of mathematics [10].

## 2. Materials and Methods

Current textbooks of higher mathematics are basically based on the rigorous logic system of “axiomatic definitions, theorems and proofs”. There is no introduction to the background and evolution of these theorems and formulas. When teachers teach, they should put forward different requirements for different contents. Basic concepts should focus on the formation of concepts, the essence of concepts, the differences and links between different concepts. For the basic theorem, we should focus on the analysis of its background, conditions and conclusions, the ideas of the proof and the role of key steps and conditions in the proof, and clarify the role and application scope of the theorem. Through the development of mathematical modeling courses, students can improve their self-learning ability, cultivate students' initial ability to engage in scientific research, and cultivate students' spirit of unity and cooperation, thus forming a style of study that actively explores and strives for progress. Fundamentally realized the transition from exam-oriented education to quality education.

Higher mathematics not only occupies an important position in the field of science and engineering, but also has penetrated into the fields of economy, management, finance, humanities and other fields. It is increasingly becoming an important means and tool for scientific research in various disciplines. Teaching concept plays a leading role in teaching behavior. Any effective teaching behavior is conducted under the guidance of scientific teaching concept. When the teacher's original teaching concept contradicts the new teaching concept, it is easy for teachers to have three results for their teaching philosophy: the first is that the teacher's original teaching philosophy is “rejected” to the new teaching concept. Secondly, the teacher's original teaching philosophy and the new teaching concept are balanced. Mathematics has not only played a positive role in the process of human civilization, but also an important pillar to explain human civilization. We divide the history of mathematics into teaching in two ways: one is explicit integration and the other is implicit integration. The following Table shows the effects of the two integration methods as shown in Table 1 and Figure 1.

Table 1 The Function of Integrating Mathematics History into Teaching

	Design	Effect
Explicit integration	10.35±1.35	7.41±2.57
Implicit integration	9.43±3.75	8.19±1.43

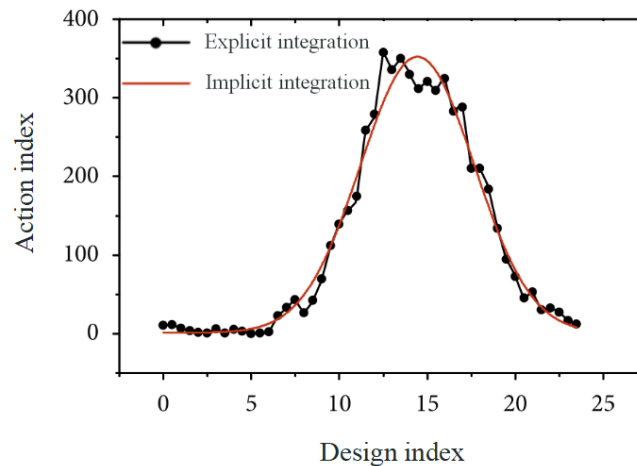


Fig.1. The Function of Integrating Mathematics History into Teaching

From the development history of higher mathematics, we can see that practice is the soil for the emergence and development of mathematics, and the unsolved problem is the source of strength to maintain the growth and development of mathematics. The formation of the concepts of derivative and integral comes directly from practice. In today's digital age, higher mathematics is closely related to people's lives. The combination of the history of mathematics and students' mathematics learning lies in the fact that the process of students' thinking is basically consistent with the process of generating mathematical thinking methods. The difficulties students encounter in class must also be encountered by mathematicians in history. Teachers can confuse students according to these problems in the history of mathematics that have puzzled mathematicians. It can encourage students to deeply understand mathematical thinking methods, ensure the continuity of thinking, and then innovate. However, these processes are presented in the textbook of higher mathematics in the form of logical reasoning, which obscures the original way of thinking of mathematicians and even misleads the direction of students' thinking. The history of mathematics can effectively help us understand the creative process of mathematics achievements, so that we can learn from the exploration and struggle of our predecessors, and enable us to gain inspiration and enhance our confidence. Therefore, it can be said that it is impossible to fully understand mathematics without understanding the history of mathematics.

### 3. Result Analysis and Discussion

The current arrangement of higher mathematics textbooks is neither based on historical development nor on the degree of difficulty. But according to the so-called "Educational Mathematics", it is specially written to make it easier for students to accept mathematical knowledge. However, such compilation is not in line with the history of higher mathematics development. At present, there are some practical problems in the teaching of higher mathematics. The main causes are as follows: 1) From the well-arranged textbooks, we can only see the successful results. 2. The teacher neglects the excavation of the history of mathematics, lacks an overall understanding of the framework of the higher mathematics system, and leads to a lack of thorough understanding of the background and concepts between the concepts of mathematics. The teaching of mathematics history into the limit concept is shown in Figure 2) "Most of the people who have studied mathematics may rarely use the professional knowledge they have learned in their lifetime, but this does not mean that their learning has no effect. It is likely that their greatest benefit lies in mastering the spirit and thinking of mathematics. And methods, improve your thinking ability, and benefit for life.

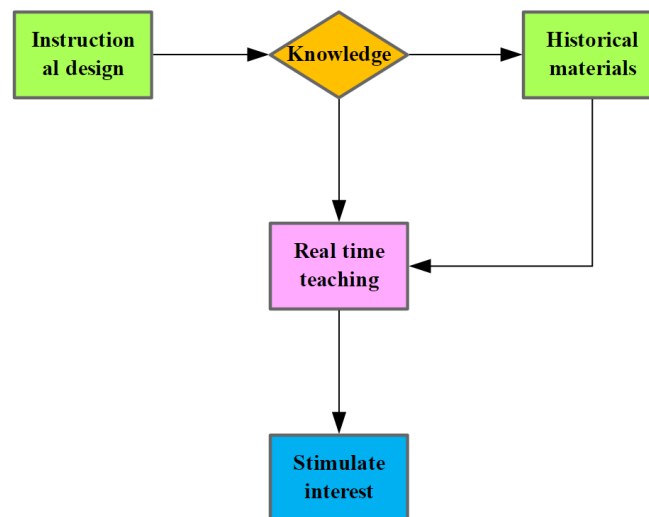


Fig.2. Integrating Mathematics History into the Teaching of Limit Concept

For the current higher mathematics teaching, its historical evolution process is particularly important for the students who have just entered the university. Because learning can not reproduce the process of all knowledge, and the current textbooks of higher mathematics are basically based on the rigorous logical system of “axiom - Definition - theorem - proof”. Therefore, the teaching of mathematics should reveal the special regularity of cognitive mathematics from the perspective of understanding mathematics. Only the teaching practice that conforms to the objective law can finally succeed. The main goal of mathematics teaching is to enable students to acquire certain mathematical knowledge and skills and acquire the ability to apply mathematics. To lay a solid foundation for future study and work. The knowledge of mathematics history is an indispensable part of the mathematical knowledge system. In the process of teaching, it is necessary to exercise the will of students to overcome difficulties, form a realistic attitude and a habit of questioning and thinking independently. Infiltrating some of the history of mathematics in advanced mathematics teaching will make students feel passionate and full of confidence in advanced mathematics learning.

When making textbooks, we should add the historical context of mathematical thought, essence and even the development of mathematical concepts to enable students to think and absorb abundant knowledge in the process of learning. Professional mathematics history teachers are indispensable. Only professional teachers can deeply grasp the depth of teaching and the rationality of content arrangement. Therefore, teachers of basic courses should be encouraged to constantly broaden their knowledge, to study, research and develop interdisciplinary and to learn professional knowledge in accordance with students' actual and social requirements. Participate in the training of professional skills, understand the requirements of the major for mathematics courses, and enrich the knowledge reserve. In the process of teaching output, perfecting its own knowledge structure and enriching its own knowledge connotation, the only way to better communicate and communicate with students and complete the task of mathematics serving professional courses. It reflects the distinctive characteristics of the school, advanced educational concepts and superb teaching standards. At the same time, it is an important way to give back to the society and realize social responsibility. It provides students and other college teachers with a good way to contact and learn the history of mathematics, which is convenient for the better and faster integration of mathematics history into higher mathematics teaching.

#### 4. Conclusion

In this paper, the reform path of the teaching method of higher mathematics course implanted in the history of mathematics is studied. Mathematics history knowledge plays an important role in

students' understanding and mastering higher mathematics knowledge, fully mobilizing students' enthusiasm and learning potential, and cultivating their independent thinking ability. In practical teaching, teachers must also follow certain principles: take their teaching process seriously, pay attention to the combination of relevant knowledge, but also pay attention to details. It has a very positive effect on expanding students' horizons and motivating students to learn mathematics. In the teaching reform, we should pay attention to the history of mathematics, understand the history of mathematics, identify the history of mathematics, and apply the history of mathematics. Make the history of mathematics better play an educational role. Only by going deep into the students' mathematics learning process, finding the joints of the mathematics thoughts and methods in the history of mathematics and the students' understanding of the changes in the process of mathematics can truly reflect the educational value of mathematics history. Introducing the history of mathematics into the higher mathematics classroom is indeed an effective reform method. As long as a reasonable reform plan is formulated and promoted step by step, it will surely achieve good results.

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