

## *Original Paper*

# Design and Construction of Ideological and Political Micro-platform for Higher Mathematics Courses

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### ***Abstract***

*This article focuses on the design and construction of an ideological and political micro-platform for higher mathematics courses. It actively builds a micro-platform for ideological and political teaching in higher education courses through two aspects: platform design and construction and the design of ideological and political elements of advanced mathematics. The project team will improve the "Basic Mathematics Knowledge of Economics and Management" Library" WeChat public platform to explore the establishment of a learning platform with the construction of course network resources and interactive integration of mathematics courses as its main modules. The goal is to truly understand students' learning status through communication between students and teachers at different stages, establish a new method system for the organic integration of advanced mathematics courses and professional courses, and form a new situation of teacher-student and teacher-teacher interaction. To serve the construction of application oriented high-level universities.*

### ***Keywords***

*curriculum ideological and political education, micro-platform, advanced mathematics*

## **1. Introduction**

On May 28, 2020, the Ministry of Education issued the "Guiding Outline for the Construction of Ideological and Political Curriculum in Colleges and Universities" (hereinafter referred to as the "Outline"), which pointed out that ideological and political education should be integrated into the talent training system, comprehensively promote the construction of ideological and political courses in colleges and universities, and give full play to the role of each course. Educate people and improve the quality of talent training in colleges and universities (Xi, 2006).

The "Advanced Mathematics" course is one of the opening courses for freshmen in our school in the first semester. It not only lays a foundation for students to study professional courses in the future, but

also implements ideological and political courses and improves the three-level ideological and political work of "school-college-class". Network system to explore the best classroom to establish effective forms and long-term mechanisms to strengthen and improve the ideological and political work of college students. Therefore, we collect and disseminate ideological and political elements of higher mathematics courses, so that students can accept cultural knowledge while learning theoretical knowledge. It is particularly important to cultivate students' correct outlook on life and values. The ideological and political education in higher mathematics courses is still in the exploratory stage in our school. The frequency of exchanges between higher mathematics teachers on ideological and political courses is relatively low and the communication methods are single. Therefore, a micro-platform for ideological and political courses is built (Zong & Chen, 2015; Lu & Jia, 2018) to use this platform. It is urgent to strengthen the collection and dissemination of ideological and political elements and achieve collaborative education.

## **2. Platform Design and Construction**

### *2.1 Platform Design*

The platform contains three modules: test question bank, knowledge structure, and courseware videos. As of the end of August 2023, there are 1,523 teachers and students following the platform. Since the establishment of the platform, teachers and students have received rave reviews. They have designed the structure of the platform, initially established relevant course resources, held a number of teaching and research activities, and increased the frequency of teacher-student interaction.

### *2.2 Content Construction*

We insist that educators receive education first, allowing teachers to fully play their role as instructors and guides for the healthy growth of students. Guide teachers to effectively combine teaching and educating with improving self-cultivation, so as to establish learning based on morality, establish one's body based on morality, and teach based on morality. Teachers strengthen theoretical study by learning to understand the spirit of documents and reading literature, actively participate in teaching reform meetings and listen to lecture reports, pay attention to news trends, grasp real-time hot spots, and constantly improve their ideological and political level. Extract positive moments from hot news and integrate them into the teaching process to cultivate students' correct values.

The advanced mathematics course is a highly theoretical natural science subject that emphasizes various mathematical experiments and approaches the objective world while making constant mistakes. This kind of thinking that is not afraid of making mistakes from a macro perspective and is brave and persistent is itself a very good ideological and political element. It can help students realize that the process of scientific research means continuous practice and the courage to question, so that they can do better research. In the teaching process, the development history of probability theory is combined, and patriotism education and personality charm education are effectively integrated to subtly cultivate students' patriotic feelings and rigorous scientific attitude.

Collect ideological and political related materials before class, use the interactive area of the micro platform to process the collected teaching materials, and invite professional course teachers to participate in teaching design for students in different majors. The project team members look for knowledge points related to professional courses and integrate them into the ideological and political courses. Knowledge points and timely moral education. Ideological and political elements are integrated into the class to educate and cultivate people. Teachers create problem situations and use a question chain method to teach. They introduce real-life examples or news hot spots that students are concerned about, and present them in various forms. Students conduct group discussions on the problems, and teachers comment on the results of the students' discussions. Teachers and students interact frequently throughout the classroom, and students' enthusiasm for learning and exploration is significantly improved. Students can feel the ideas and processes of scientific research, and cultivate students' interest in scientific research. Use the micro platform to discuss after class. Be able to draw inferences from one instance and make a comprehensive understanding. The knowledge points involved in the class, mathematical famous sayings, traditional culture, and the history of mathematics can all be used as objects of discussion for students after class, responding to the call for online and offline hybrid teaching.

### 3. Design of Ideological and Political Elements of Advanced Mathematics

Sequence limit is the basic theory of advanced mathematics. It explains the process of always beating and getting infinitely close to the goal. Just like our ideal, we should not forget the original intention, forge ahead, and get infinitely close before we can always achieve it. Calculate  $(1+0.01)^{365}$  and  $(1-0.01)^{365}$ , the two results are 37.8 and 0.03, and we draw the conclusion: accumulation of small steps will lead to a thousand miles, accumulation of laziness will lead to the abyss, working hard every day, you will reap great success after a year; and being lazy every day will lead to great success. If you are just a little bit, you will be left far behind. You must always keep up with the times, because those who work just a little bit harder than you every day will eventually leave you far behind. Start with life materials and guide students to discover the mathematical elements and philosophical ideas contained in beautiful things make aesthetic education and intellectual education complement each other and cultivate students' positive emotions of loving life and learning.

Introduction of the derivative problem: Since the Renaissance in the early 15th century, Europe's industry, agriculture, navigation and merchant trade have developed on a large scale, forming a new economic era. In the 16th century, Europe was in the budding period of capitalism, productivity has developed greatly. The development of production practice has raised new topics for natural sciences, urgently requiring the development of basic sciences such as mechanics and astronomy, and these disciplines are deeply dependent on mathematics, so It also promoted the development of mathematics. Among the various requirements for mathematics in various disciplines, the following three types of problems led to the emergence of differential calculus:

- (1) Find the instantaneous speed of variable speed motion;
- (2) Find the tangent line at a point on the curve;
- (3) Find the maximum and minimum values.

The realistic prototypes of these three types of practical problems can be mathematically attributed to how quickly the function changes relative to the change of the independent variable, which is the so-called rate of change of the function. Newton started from the first question, and Leibniz started from the second. Starting from two problems, the concepts of derivatives are given respectively.

The concept and properties of definite integrals

The Zhaozhou Bridge is the crystallization of the wisdom of the ancient working people and created a new situation in bridge construction in China. Show photos of the Zhaozhou Bridge and think about how to calculate the arch cross-sectional area of the ancient Zhaozhou Bridge? Archimedes' parabolic area problem: In his treatise "The Quadruple of Parabolas", the ancient Greek mathematician Archimedes used the exhaustive method to prove that the area  $S$  of a parabolic arc is a triangle with the same base and equal height. Three-fourths of the area. The process of taking the limit reflects the rigor of mathematics. After teacher-student interaction, graphics are gradually used to help students understand the idea of limits, and the idea of limits is raised to the field of philosophy, that is, a leap from quantitative change to qualitative change. Let While students deeply understand the scientific nature and rigor of mathematics, it also helps students develop good study habits, rigorous thinking, and a realistic work style.

Basic formulas of calculus

Newton (1643-1727) was born in a small village in the countryside of Lincolnshire, England in 1643. His father died when he was three months old. He dropped out of school at the age of 14 and was admitted to Cambridge University at the age of 17. First College. Newton mentioned "fluidity" in a manuscript on May 20, 1665. Some people regard this day as the birth date of calculus. The next year, Newton wrote "A Brief Theory of Flux Numbers" is considered to be the first document in the history of mathematics to systematically discuss calculus.

Through a brief introduction to Newton, it can not only arouse students' interest, but also let students feel the mathematician's continuous pursuit of knowledge and great achievements, providing positive guidance and motivation students and promote their positive growth.

#### 4. Summary

The advanced mathematics course is a highly theoretical natural science subject that emphasizes various mathematical experiments and approaches the objective world while making constant mistakes. This kind of thinking that is not afraid of making mistakes from a macro perspective and is brave and persistent is itself a very good ideological and political element. It can help students realize that the process of scientific research means continuous practice and the courage to question, so that they can do better research. In the teaching process, the development history of probability theory is combined,

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