

Innovation Model and Practice of Implantable Teaching of Ideological and Political Gene in Advanced Mathematics

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Abstract: Advanced Mathematics itself has the unique advantages of organic integration. In order to build the public Mathematics course ideological sports system, this paper to Advanced Mathematics curriculum for the pilot teaching reform practice, Mathematics, Mathematics thought and culture contains ideological elements through "gene implanted" teaching mode into the course teaching, has achieved good teaching effect.

1. Introduction

Advanced Mathematics is an important general compulsory course offered by all non-mathematics majors in universities, which plays an important role in learning the follow-up professional courses and improving students' comprehensive ability. There have been many studies on the ideological and political courses of Advanced Mathematics [1-4], But due to the course itself theory system is rigorous, abstract concept, coupled with less class, content, students Mathematics foundation is weak, traditional teaching still pay attention to "knowledge" light ", ideological education elements related to moral education, and professional is less, more lack of students' outlook on life, values and world outlook, curriculum education consciousness is not really into the teaching process, lead to classroom efficiency, curriculum associated of professional identity and belief is not high enough.

Then, how to integrate professional knowledge teaching and ideological value leading in teaching, and evenly dissolve the "salt" of thinking and politics in the "soup" of professional courses, so that students can naturally absorb the "nutrition"? The Advanced Mathematics course itself has the unique advantage of organic integration with many ideological and political elements. In order to play the function of professional courses of moral education, build the classroom teaching full, full, comprehensive sports system, we take the Higher Mathematics as the pilot course for the teaching practice reform, by fully mining Mathematics subject characteristics and advantages, refining the course of gene and scientific value paradigm, the students cultivating shape through the "gene implant" method into the Mathematics classroom, in the ideal faith, inspire students 'love of professional, improve students' interest in Mathematics knowledge, cultivate students rigorous realistic rational spirit.

2. Construction of "gene implantable" teaching model of Advanced Mathematics

Biological research often needs to implant genes into cells. The common practice is to embed gene sequence fragments into DNA cell chain for invertase protein, and then catalyze body metabolism under the action of ligase and other inducing compounds, so as to achieve the effect of improving body function. In the classroom teaching, this method is called the "gene implantation type" teaching strategy. The theoretical knowledge system of specialized courses is regarded as a genetic sequence, embedded in ideological and political elements, and the internalized results of course knowledge can be formed through the organic integration of teaching ideas, teacher guidance and teaching situation, so as to change the learning behavior, arouse students' interest and desire in learning, and promote students to actively master knowledge and skills. The teaching model is as shown in Figure 1.

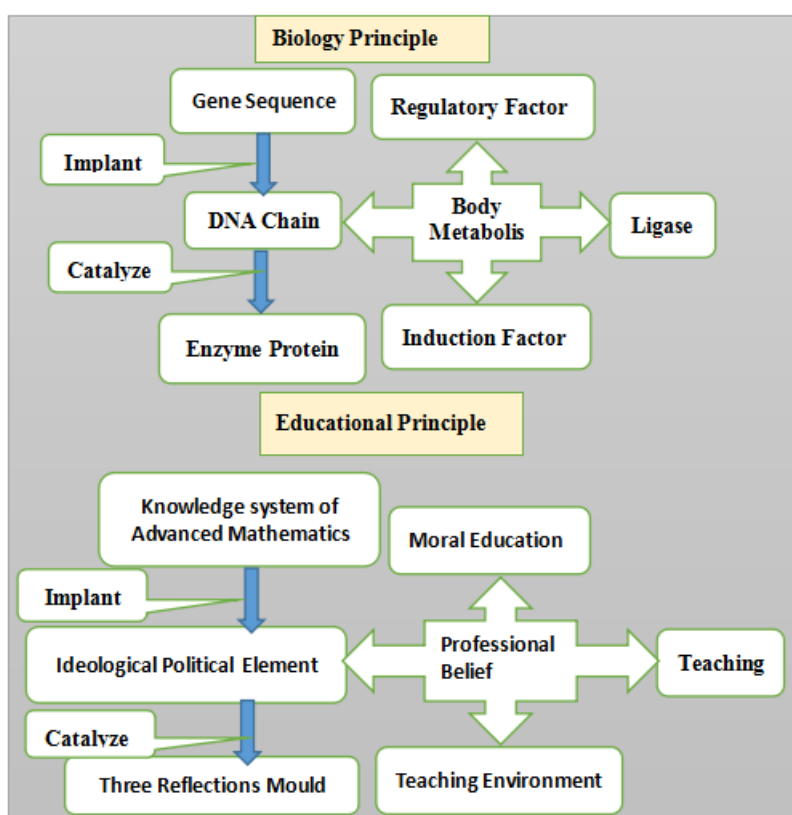


Figure 1: Ideological and Political Gene Implantation Innovative Teaching Model

We take the teaching content as the carrier and the characteristics of Mathematics, timely implant the "genes" of various ideological and political elements into the course, spread the positive energy shaped by the three views, and encourage freshmen to have the motivation of learning and academic ambition. Specific practices include.

2.1. Teaching objective design focuses on the "combination of art and Taoism", embedding academic connotation and scientific literacy genes

The ideological and political objectives of the course are as follows: first, by introducing the Mathematical ideas in calculus and the close connection with the reality in the teaching, the students can understand the basic Mathematical thinking methods. Gradually cultivate students' abstract and

summary problems, logical reasoning, spatial imagination and skilled Mathematical ability and scientific thinking ability. Second, through understanding the relevant Mathematical history development and its role in social development, cultivate the students' 'dialectical materialism world outlook, enhance the concept of patriotism and set up the correct values and outlook on life, cultivate the student's ability of communication and team cooperation spirit, make the students in the process of learning Mathematics serious, realistic, diligent study spirit. The third is to cultivate students' ability to find and solve problems, to use the theories in the process of learning and practice, constantly make self-diagnosis, improvement and improvement, optimize their own professional planning, and form the concept of lifelong learning.

2.2 Recombination and re-engineering of teaching content, embedding ideological and political genes such as mathematical history, mathematical thought, philosophy and culture

(1) The history of mathematics contains many genetic elements of patriotism and humanistic spirit. In the classroom teaching design, we should consciously introduce the achievements made in the study of the history of mathematics in China, and understand the great contributions made by Chinese scientists in the development of mathematics. For example, when teaching the concept of limit, in the Spring and Autumn Period, "poor, or former, not ruler"; in the warring States Period, in the world of Zhuangzi, the "one foot hammer, half, inexhaustible". These are a simple and intuitive understanding of extreme ideas. Liu Hui's proof of the circle area formula is recognized as the first time in the history of world mathematics to introduce the limit ideas and the infinitesimal division method into the mathematical proof. On the basis of the Southern and Northern Dynasties, Zu Chongzhi refined the PI to seven decimal places, more than a thousand years earlier than the Europeans. These historical materials not only deepen the understanding of the ultimate concept, can grasp the essence of the concept, but also enhance students' cultural confidence and national pride, stimulate students' patriotic feelings and the motivation to pursue scientific truth.

(2) Mathematical thought is also an important gene of ideological and political courses. When teaching calculus of one-yuan function, explain the origin of the core concepts with the help of the development history of calculus, so that students can better master the idea of calculus on the basis of fully understanding the basic laws of mathematical development. For example, derivative originated from two scientific problems in the 17th century: the study of the design of optical lens and the calculation of trajectory trajectory; the calculation of the instantaneous velocity of the essence of the derivative- -the instantaneous rate of change. The characterization of the instantaneous leads to the differential concept and the differential idea. The concept of definite integral also arises from two kinds of scientific problems: the first is the known acceleration function to find the instantaneous speed and distance, the second is the length of the curve, the area of the curve, the volume of the curved surface. The commonality of these problems is the solution of non-constant quantity, which can be solved by the idea of "breaking the whole into zero with the straight curved product zero as the whole", which is the idea of fixed integral. The idea of calculus not only enables students to experience the formation process of abstract concepts, and clearly realize that mathematics comes from reality, but also understand that complex things are combined by simple things, which we need to decompose with wisdom and do things rationally and peacefully.

(3) The implantation of mathematical philosophy and mathematical culture genes. The comparative concepts of functional continuity and continuity, derivative and integrability, indefinite integral and definite integral contain the dialectical philosophical law of contradictory unity, universal connection and negation; the series theory reveals the law of quantitative change in dialectical materialism; learn the geometric application of definite integral, let students calculate the

arch area and arc length of Zhaozhou Bridge, experience the scientific spirit of "great craftsman" to explore, and improve the ability to solve practical problems with mathematics. Three crises in the history of mathematics, let students see that the development of any subject is not smooth sailing, "crisis" and "opportunity" coexist, as long as adhere to the scientific concept and correct methods, we can get a breakthrough and solve the crisis. In addition, the classroom with mathematician struggle and celebrity anecdotes, the aesthetic value of mathematics mathematics culture can help students to the development of higher mathematics discipline, which guide students to set up the correct view and lofty ambition, cultivate the courage to bear, unremitting and unyielding learning attitude and the scientific spirit of the pursuit of truth.

In terms of teaching methods, attention is paid to the effectiveness of ideological and political gene information transmission, avoiding rigid preaching and one speech, and embedding various interactive elements into teaching activities. For example, the online teaching platform that provides students with courseware, videos, expand resources, assignments, discussions and quizzes. The online platform also asks students to complete certain task points, such as self-study and discussion; It asks students to consult information after class to complete some comprehensive training; Explaining the key and difficult points, taking peer support, group mutual assistance and other cooperative learning methods in classroom flipped teaching; The online teaching uses the platform software for bullet screen, submission and random roll call, etc.. Use of teaching AIDS and inter-group competitions in offline teaching, so as encouraging students to go into the platform to calculate, deduce the puzzle process and other multiple ways. Then we also guide students to actively participate in thinking, stimulate their interesting and focus on professional courses, to achieve the purpose that triggering students' cognitive, emotional and behavioral identity, and realizing the organic unity of knowledge transmission and value guidance in the interaction. On account of the subtle influence of classroom teaching, the "ideological and political goals" of cultivating socialist core values can be achieved, due to the ingenious implantation of ideological and political genes such as patriotism, social responsibility, cultural confidence and humanistic spirit.

3. Effect and thinking on the practice of "gene implantable" teaching model

The effect of the reform of ideological and political teaching mode in high mathematics classroom is reflected in all aspects of students' knowledge, affection, faith and practice. Its form is complex, with explicit and implicit, direct and indirect, short-term and long-term different results. Therefore, the evaluation of ideological and political effect of the course cannot be simply quantified. In the practice of teaching reform, we explore the ideological and political trigger points of the course through teaching group discussion, open class and demonstration micro class, and built the ideological and political index decomposition database and teaching case database, integrated teaching and create a new high mathematics class with both professional characteristics and ideological and political connotation, and examine the effect of teaching reform through classroom observation, questionnaire survey, interview and special discussion. Effective standard to "learning material (depth), someone (interaction), eyes have light (understanding), smile on the face (positive response)", the results show that students are more likely to accept the "education gene implant" teaching method, can actively participate in the classroom, learning enthusiasm, reached the positive teaching effect, proved that the teaching reform is feasible and productive, and has a lot of development space, let the traditional boring mathematics classroom coruscate the new charm.

There are many ideological and political genes that can be implanted in mathematics courses, and the key "catalytic enzyme" is the teacher. In the teaching of ideological and political gene implantation, we should be good at telling "mathematical stories", hide motives, transform profound

mathematical thoughts, abstract mathematical concepts and theorems into vivid language and cases, and naturally insert ideological and political elements in the teaching process. Too obvious and abrupt insertion can make a person feel too stiff, cannot play the original educational role. Only jump out of the traditional teaching framework, mining close to life, close to the professional, can touch students interest point of ideological material, make ideological ideas throughout professional learning, and mathematical knowledge achieve mastery through a comprehensive study, in the "silent" build conform to the socialist core values of "mathematics", can let the students happy, easy to accept, truly "khalid ents".

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