

Research on the Ideological and Political Teaching of Advanced Mathematics Course

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Abstract: The core of curriculum ideological and political education is to build a complete, whole-process, comprehensive education pattern, the ideological and political education into all kinds of curriculum teaching, curriculum teaching and ideological and political education together, the construction of collaborative education mode, to promote students' moral, intellectual, physical and comprehensive. Advanced Mathematics teachers in colleges and universities should keep pace with the era, excavate the ideological and political elements contained in textbooks, and cultivate students' research spirit. Teachers should skillfully infiltrate the mathematics culture, carry forward the excellent traditional culture of the Chinese nation, and cultivate the students' cultural self-confidence. In addition, teachers should also fully infiltrate humanistic feelings, guide students to feel the life philosophy contained in Mathematics, and cultivate their positive attitude towards life besides cultivating students' mathematical thoughts and thinking, guide them to establish a correct outlook on life and values, give full play to the unique educational value of mathematics, and let students fall in love with Advanced Mathematics.

Keywords: Advanced mathematics; Curriculum thinking and politics; Necessity; Current situation and countermeasures

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1. Introduction

University Mathematics courses cover a wide range of majors and have a large number of students. They provide necessary data tools for students of various majors to learn professional courses, which is conducive to cultivating students' logical reasoning ability, spatial imagination ability and modeling ability, and is conducive to cultivating students' rigorous and serious, seeking truth from facts and scientific inquiry spirit, and further promote the ideological and political construction of courses. Advanced Mathematics teachers should give full play to their ideological and political education advantages, subtly infiltrate the mathematical culture, lead students to explore the great achievements made by Chinese mathematicians, enhance their patriotic enthusiasm and cultural confidence, integrate ideological and political education into comprehensive mathematical practice activities, let students personally feel the value of ideological and political education contained in Mathematics, and let them experience the unique charm of Mathematics to stimulate their interest in Mathematics learning

and improve the quality of Advanced Mathematics teaching.

2. The necessity of ideological and political construction of Advanced Mathematics curriculum

2.1. Requirements for the development of education in the new era

Advanced Mathematics curriculum should actively promote curriculum thinking and politics, carry forward mathematics culture, present students with brilliant mathematical achievements of our country, stimulate their national pride and cultural confidence, infiltrate scientific spirit and comprehensive education in the teaching of mathematical concepts and formulas, cultivate their academic attitude of advocating science, rigorous and realistic, and further improve their dialectical thinking ability and scientific spirit. This will definitely give full play to the educational value of Mathematics in universities ^[1].

2.2. It is necessary to improve the cultural self-confidence of college students

Advanced Mathematics embodies natural science, history and humanity, rigorous dialectical thinking, mathematical formulas and definitions, and also shows the ancient mathematical cultural achievements with a long history and the story of the struggle of Chinese mathematicians. Teachers should explore the mathematical culture contained in the textbooks, and lead students to explore the great achievements of Chinese mathematical works and mathematicians. To enhance their cultural and national self-confidence, improve their sense of national honor, and further cultivate their feelings of home and country ^[2].

2.3. Fulfill the objective requirements of the fundamental task of cultivating morality and people

Curriculum thinking and politics is an important way to carry out the fundamental task of educating people, and it is also an inevitable choice to improve the teaching quality of Advanced Mathematics courses. Under the background of ideological and political curriculum, Advanced Mathematics teachers should dig deeply into the ideological and political elements contained in textbooks, integrate ideological and political education with mathematical knowledge points, let students feel the life philosophy and traditional cultural elements contained in high mathematics, cultivate their scientific spirit of bold questioning and scientific reasoning, and lay a good foundation for their professional course study and future employment ^[3]. At the same time, teachers should show the application of Mathematics in the fields of artificial intelligence, cloud computing, and Internet of Things to stimulate students' innovative thinking and improve the ideological and political construction and education quality of Advanced Mathematics courses.

2.4. It is an inevitable choice to respond to the concept of Five Education

Five Education advocates the promotion of the comprehensive development of college students' morality, intelligence, physical education, aesthetics and labor, which coincides with the concept of ideological and political education of the curriculum, further improves students' aesthetic ability and humanistic quality, increases the interest and artistry of college mathematics learning, to stimulate students' interest in education ^[4]. Advanced Mathematics teachers should explore the elements of dialectical thinking, mathematical aesthetics and mathematical culture contained in textbooks, let students understand the application of mathematics in architecture, art design and other fields, improve their ability to appreciate and create beauty, guide students to read ancient mathematical books such as Nine Chapters on Arithmetic, and encourage them to learn the research spirit of mathematicians ^[5].

3. Current situation of ideological and political development of Advanced Mathematics courses

3.1. Teachers' ideological and political education ability needs to be improved

At present, the ideological and political education of college curriculum is in full swing, but the ideological and political effect of Advanced Mathematics curriculum is not satisfactory, the fundamental reason is that the ideological and political education ability of high school mathematics teachers needs to be improved, which is mainly reflected in the following two aspects:

- (1) First, some Advanced Mathematics teachers have a shallow understanding of ideological and political curriculum, or mainly explain mathematical key points, only by browsing through ideological and political education, the penetration way is blunt and difficult to stimulate students' emotional resonance^[6].
- (2) Second, some teachers do not exert much importance to ideological and political education, thinking that ideological and political education is the responsibility of ideological and political teachers and counselors, and seldom spend energy and time to deliver the ideological and political elements contained in textbooks, design ideological and political education cases, and it is difficult to play the value of Advanced Mathematics ideological and political education.

3.2. The connection between ideological and political education and the key points of Advanced Mathematics is unreasonable

Under the background of curriculum ideological and political education, Advanced Mathematics teachers should integrate mathematical knowledge points with ideological and political education. However, in teaching practice, teachers fail to grasp the relationship between ideological and political education and mathematical knowledge points, resulting in only rigid application or implantation of curriculum ideological and political education. The construction of Advanced Mathematics curriculum for ideological and political education lacks flexibility and innovation, and it is difficult to stimulate students' learning interest. At the same time, some teachers do not identify the correct entry point of ideological and political education, which affects the integration of college mathematics and ideological and political education, and greatly reduces the quality of ideological and political education^[7].

3.3. The penetration path of ideological and political education is relatively simple

The ideological and political education of Advanced Mathematics teachers habitually intersperses relevant mathematician stories in the teaching of mathematical concepts and formulas, ignoring the extension of ideological and political education to comprehensive mathematical practice activities and problem-solving teaching. The single ideological and political infiltration channel affects the ideological and political construction of the curriculum^[8]. In addition, some teachers ignore the interaction with students in the course of ideological and political construction, limit themselves to explaining the mathematical culture in the textbooks, the stories of mathematicians and other ideological and political elements, and neglect to integrate into the frontier scientific research results of mathematics, resulting in the lack of innovation in the context of ideological and political construction of the course, which affects the quality of the course ideological and political construction^[9].

4. The ideological and political teaching countermeasures of Advanced Mathematics courses

4.1. Explore ideological and political elements in textbooks to cultivate students' scientific spirit

Under the background of curriculum ideological and political education, Advanced Mathematics teachers

should study the textbooks deeply, refine the ideological and political elements contained in the textbooks, carefully make ideological and political education cases, integrate mathematical knowledge points with ideological and political education, and achieve the win-win situation of Advanced Mathematics teaching and ideological and political education ^[10]. For example, when teachers explain the concept of limit, teachers can guide students to verify Liu Hui's circular cutting algorithm, let them experience the relationship between number series and limit thought, let them feel the wisdom of mathematicians in the past and the difficulty of exploring the truth, and encourage them to learn the mathematicians' research spirit of seeking truth from facts, perseverance and down-to-earth, to improve their mathematical learning ability. Students can try to verify Liu Hui's circular cutting principle by using pen calculations, using different mathematical formulas to calculate, connect related knowledge points, and deeply understand the history, culture and scientific spirit behind mathematical concepts and definitions.

Secondly, teachers can combine mathematical theorems and formulas to carry out ideological and political education, such as Taylor's Theorem, Fermat's Last Theorem and other advanced mathematical theorems and formulas, and encourage them to use the Internet to search the stories behind these mathematical formulas, further enrich their mathematical knowledge and improve their mathematical independent learning ability. For example, some students think that Taylor's Theorem is a general method to express a function by polynomials and try to use the geometric drawing board to carry out three arithmetic operations of finite addition, subtraction and multiplication of independent variables, to feel the rigor of Taylor's Theorem and better grasp the application of this formula ^[11].

4.2. Fully infiltrate mathematical culture and cultivate college students' cultural self-confidence

Advanced Mathematics teachers should actively explore the mathematical cultural elements contained in the textbooks, carry forward the excellent traditional Chinese culture, lead students to understand the achievements of Chinese mathematicians, and further enhance their national pride and cultural confidence. For example, when explaining knowledge related to linear equations, teachers can introduce Nine Chapters on Arithmetic, a Chinese work in the field of mathematics, to explain to students the use of the separation coefficient method to represent linear equations and introduce relevant cases to guide students to compare the separation coefficient method with today's matrix, so that they can feel the charm of traditional mathematical culture ^[12]. The separation coefficient method used in Nine Chapters on Arithmetic is used to express linear equations, and the multiplication and division method of positive and negative numbers is also proposed, which breaks through the range of positive numbers. This is the earliest complete solution of linear equations in the world, which has a very important position in the history of world Mathematics and is conducive to stimulating students' patriotic enthusiasm and national pride. In addition, teachers can also introduce the teaching cases in Nine Chapters of Arithmetic, such as the "Equation" chapter on the use of direct division to solve linear equations, encourage students to deeply study direct division, let them feel the wisdom of mathematicians in the past, let them feel the vitality of traditional mathematical culture, diverge their mathematical thinking, to improve their mathematical problem-solving ability. Mathematics culture is conducive to promoting the ideological and political construction of college mathematics courses, improving the interest in Mathematics teaching, helping students to master complex and abstract mathematical knowledge, deepening their understanding of mathematical culture, and cultivating college students' cultural self-confidence.

4.3. Fully infiltrate the humanities education to shape the sound personality of college students

Advanced Mathematics teachers should actively infiltrate comprehensive education. On the one hand, they

should collect inspirational stories of mathematicians, set a good example for students, and cultivate their beautiful virtues of never giving up, pioneering and innovative, scientific and rigorous. On the other hand, they can excavate the life philosophy contained in mathematics, guide students to look at setbacks correctly and cultivate their fighting spirit ^[13]. For example, when teachers explain the knowledge related to differential and integral, they can introduce the relevant research results of mathematicians Descartes, Newton and Leibniz on calculus, show the inheritance and development of mathematicians from different countries in the same field, let students understand that maths has no borders, encourage them to learn from the achievements of foreign mathematicians, and improve their humanistic literacy. Teachers can explain the concept of variables proposed by Descartes to students, and combine variables, motion and mathematics for analysis to help them understand the concepts related to calculus, and then introduce the Newtonian and Leibniz formula to encourage students to verify this formula in-group cooperation, and cultivate their teamwork and scientific inquiry spirit. Some groups can learn differential method in the maximum, minimum, inflection point and optics and other aspects of the wide application through the study of series difference operation, and in-depth understanding of the application value of calculus, to learn Leibniz's pursuit of truth, and his scientific spirit ^[14]. Teachers can combine calculus images to infiltrate ideological and political education, so that students understand that all things have ups and downs, guide them to correctly view the peaks and valleys in study and life, improve their ability to resist setbacks and hard work, and give play to the value of university mathematics ideological and political education.

4.4. Focus on the cultivation of students' mathematical thinking and improve students' moral quality

Mathematics teachers in colleges and universities should attach importance to the cultivation of students' thinking ability, connect Mathematics teaching and ideological and political education closely, further correct students' views on life, values and world, to achieve a win-win situation between Advanced Mathematics teaching and ideological and political education. First, when explaining the relevant knowledge of differential equations, teachers can use micro-lessons to introduce Malthusian Growth Model, dynamically display the relationship between population quantity and time, encourage students to use tools to solve the limit of the population model, closely link mathematics with social development, guide students to link personal development with social development, and enhance their sense of social responsibility. Students can independently use the tool to calculate the population model, scientifically demonstrate the relationship between time and population, and deduce that as time goes by, population growth tends to be infinity. Due to the limited resources of the earth, therefore, we should scientifically control population growth and build a development model of harmonious coexistence between man and nature ^[15].

Second, teachers can encourage students to introduce their calculation process, learning experience, and organize students to have discussions. This can create an active math classroom atmosphere, and cultivate students' good mathematical logical thinking and dialectical thinking abilities. Through the study of Malthusian Growth Model, students can understand the application of mathematics in social and economic development, transfer mathematical knowledge to practical problems, use mathematical knowledge to solve practical problems, improve their ability to solve problems, enhance their sense of social responsibility, and improve the quality of ideological and political construction of Advanced Mathematics courses.

5. Conclusion

In short, mathematics teachers in colleges and universities should keep pace with this era, actively promote the

ideological and political construction of the curriculum, dig deep into the ideological and political elements contained in textbooks, clarify the convergence of ideological and political education and mathematical knowledge points, carry forward the scientific spirit of mathematicians, cultivate students' spirit of innovation, actively penetrate mathematical culture, and lead students to explore mathematical achievements in the past, while enhancing their cultural self-confidence and patriotic enthusiasm. At the same time, teachers should skillfully use comprehensive education to make abstract mathematical knowledge points more interesting, stimulate students' emotional resonance, cultivate their fighting spirit of daring to challenge and never giving up, establish a close connection between mathematics and life practice, enhance students' social responsibility, and promote the high-quality development of Advanced Mathematics curriculum.

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