

Research and Exploration on Ideological and Political Education of Higher Algebra Course in Colleges and Universities

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Abstract: This paper analyzes the necessity of carrying out ideological and political construction of higher algebra course, introduces the construction idea of integrating ideological and political elements of higher algebra course with the specialty of information and computing science, and puts forward the practical teaching reform proposal of “adjusting and optimizing the teaching content, fully exploring the ideological and political elements of the course, highlighting the application of higher algebra, and improving the training quality”. This paper discusses the main tasks of the ideological and political construction of the subsequent higher algebra courses.

Keywords: advanced algebra; Curriculum ideological and political education; Teaching cases; reform in education

1. The Necessity of Integrating Ideology and Politics into Higher Algebra Teaching

In December 2016, the National Ideological and Political Work Conference of Colleges and Universities pointed out that ideological and political courses should be organically combined with the ideological and political essentials of the courses to educate people in the whole process and in an all-round way, so that all kinds of courses and ideological and political theory courses can work together to form a synergistic effect of educating people and talents. Colleges and universities began to actively promote and advocate the integration of ideological and political education into classroom teaching, comprehensively implement intellectual education and moral education, actively build a trinity education and teaching system of political theory courses, professional courses and comprehensive quality courses, guide students to establish a correct world outlook, outlook on life and values, and cultivate students to become responsible and responsible in the new era.

In combination with the school running orientation of “building an application-oriented undergraduate university with distinctive characteristics” and the training requirements for professional innovative talents with the ultimate goal of “professional education, practice and innovation, moral cultivation, and education with characteristics”, the university combines professional learning with value guidance to deepen the reform of all university courses and carry out ideological and political education. College students are in the establishment period of “three outlooks”. Teachers consciously and effectively carry out ideological and political education for students, make students more interested in higher algebra courses, and use harmonious teacher-student relationship to guide students to learn and master knowledge, and finally achieve the ultimate goal of ideological and political courses.

Among them, professional courses cannot be absent from the ideological and political curriculum. Taking the advanced algebra course of information and computing science as an example, the course mainly faces freshmen, with many teaching contents and strong abstractness. The traditional teaching mode of definition theorem proof has become a thing of the past. As a mathematics major course, this course is also a postgraduate course. It can not only master the basic knowledge of advanced algebra, but also improve the ability of abstract thinking and logical reasoning through the study of this course. In addition, the development of higher algebra has a long history. Its definition, theorem and nature are closely related to life, social development and scientific and technological progress. By analyzing the characteristics of the course and the goal of ideological and political education of the course, reforming the teaching mode and method,

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introducing situational teaching, adding practical cases for specific applications, designing the teaching content of ideological and political education of the course, improving students' interest in learning, and realizing the organic integration of higher points and ideological and political education of the course are currently effective methods. It is urgent for colleges and universities to actively practice ideological and political reform of courses, optimize teaching objectives, sort out teaching content, extend teaching connotation, and implement the construction of ideological and political integration of courses.

It is one of the key ways to help college students improve their scientific and cultural literacy and ideological realm to integrate the ideological and political curriculum into the teaching of higher algebra courses, focus on the ideological and political resources of mathematics courses, and highlight the value of mathematics education. Most of the students in the second undergraduate college have some problems in their basic mathematical literacy. Highlighting mathematics teaching can help students further understand the higher algebra curriculum, strengthen their ideological and cultural construction, and achieve the educational goal of cultivating morality and cultivating people. It is also an urgent need for our current ideological and political curriculum and curriculum construction.

2. The Implementation of Ideological and Political Education in Higher Algebra

Based on the background of big data era and the new needs of our university's application-oriented university, the courses of information technology specialty highlight their applicability, as well as the functionality of cross disciplines such as information engineering and computer. How to organically integrate ideological and political elements in the course implementation stage, we proposed the implementation of the teaching reform of "adjusting and optimizing the teaching content, fully exploring the ideological and political elements of the course, highlighting the application of higher algebra, and improving the training quality". The main task of the curriculum is to guide students to pay attention to the society, cultivate their family and country feelings, and actively spread the "four self-confidence" and socialist core values.

We organized the course content in a modular way. The course content of advanced algebra mainly includes polynomial theory and linear algebra. The main content of linear algebra takes linear equations as the main axis, and emphasizes the process of solving linear equations by using different tools; correctly guide students to distinguish between college mathematics and junior high school mathematics—the introduction of number fields. The determinant, matrix and vector group are introduced and expanded as tools for solving linear equations. After modularizing the contents of Volume I, students have a clear understanding of learning and grasping knowledge; among them, the mathematician CLEM used determinant to study the solution of linear equations with the number of unknowns equal to the number of equations, which is one of the most perfect theories recognized by the world at present. We can use the history of mathematics as the starting point of ideological and political education to guide students to cultivate the spirit of hard study and be good at discovering beauty. In addition, we found that although the process of solving linear equations using determinant and matrix is different, the results are consistent. After all, the solutions of linear equations are constant. We encourage everyone to use philosophical thinking to think about problems, be brave in innovation and pursue excellence. The matrix theory can help us solve the problem of the solution form and structure of a linear equation. We can introduce some practical problems and current scientific and technological hot issues, increase students' interest, expand their horizons, and cultivate their creative thinking. The information encryption, information transmission, cryptosystem model, 3D printing and other knowledge related to matrix operation guide students to discover the beauty of mathematics, reflect the beauty of mathematics, and reflect the ubiquity of mathematics.

The content of the next semester starts from the quadratic form, and the learning content and method are very different from the polynomial theory. The core content is the solution of transforming the quadratic form into the standard form. In fact, this part is the process of transforming the symmetric matrix corresponding to the quadratic form into the diagonal matrix. From different perspectives, the essence is exactly the same. We cultivate students "ideological and political concept of seeing the essence through the phenomenon, encourage students to master the mathematical thought of transformation, reduce complexity to simplicity, draw inferences from one instance, and thus cultivate students' logical thinking ability. Vector space, linear transformation and Euclidean space are the core contents of abstraction in higher algebra. In the process of learning, we should cultivate students' abstract thinking, holistic view, global view and dialectical view. Use Feynman skills according to different tools to arrange and sort out the complicated knowledge points, and cut the learning content and tasks to achieve the learning mode of "big to small, small to nothing"; Use the module content to improve the theoretical knowledge system learning and innovation ability training, and pay attention to value guidance and output guidance.

Secondly, further strengthen the construction of curriculum ideological and political resources, take "curriculum ideological and political" as the carrier, the teaching content as the chain, and the introduction of Advanced Algebra as the starting point, so as to clarify the goal of ideological and political education. Deeply realized that the focus of the ideological and political construction of the course is to find and enrich the contacts and integration points of professional knowledge and ideological and political elements, so as to make it become an active water with a basic purpose. How to integrate the ideological and political elements of the course into the professional classroom teaching naturally and harmoniously, and make things smooth and silent is the difficulty of the ideological and political construction of the course. In combination with the teaching practice, we discuss some integration points of the ideological and political education of the higher algebra course:

Global perspective: With the background of fast computer solution of linear equations, we introduce the Chinese supercomputer system Tianhe-2, which has a computing speed of 549 million times per second, surpassing the fastest computer speed in the world of Titan, the United States. This is the real Chinese speed. We encourage our colleagues to base themselves on the global perspective, create the grand

goal of the future, pursue the truth, and take promoting the well-being of all mankind as their own responsibility.

Cultural confidence: Chinese scholars, in combination with the development and strength of mathematics, guide students to master the academic frontier, cultivate a sense of responsibility and mission to climb the peak, and guide students to have cultural confidence in cases such as the brilliant achievements of two bombs and one satellite, Shenzhou 13, and Shenzhou 14 manned spacecraft.

Legal awareness: Take the information transmission in cryptography as an example, introduce the practical application of matrix operation through interactive discussion and explanation, guide students to explore the unknown scientific spirit, challenge innovative thinking, and emphasize the importance of legal awareness such as network security law. Informational war is the focus of global attention at present, belongs to the pursuit and game of the fourth space, and becomes the basic form of future war, how to be the best in the world requires the efforts of each of us.

Scientific spirit: Take Hermit, a famous 19th century French mathematician who “could not take the exam”, as the case, through the introduction of the relevant issues of “conjugate matrix” and “general solution of the quintic equation”, emphasize the “discipline knowledge+character stories+learning methods” to promote the scientific spirit, and guide students to have the spirit of scientific exploration and professional research. Secondly, the application of linear equations is introduced. Qian Xuesen, the father of China’s aerospace industry and the father of China’s missiles, has made outstanding contributions to our aerospace industry with a rigorous and diligent scientific attitude. His scientific spirit and patriotism have infected each of us and clarified our mission and responsibility.

“Family and country feelings+lead me” to grow: Introduce the application of matrix, determinant and vector group in cryptographic communication, and become a technical means of human military, political and economic struggle. Students understand the key role of mathematics in the success or failure of the war, guide students to understand the Red X and China’s two-hundred-year plans, and establish family and country feelings. The emergence of new high-tech forces represented by big data, artificial intelligence and 5G makes the promotion of mathematics to scientific and technological innovation more obvious and important. Mr. Su Buqing gave up his superior life in Japan and returned to teach. Mr. Gu Chaohao changed his research direction for the needs of the country; Mr. Li Daqian insists on giving the freshmen the first lesson every year, teaching them that they should apply what they have learned to scientific and technological innovation and serve the national development.

Team cooperation: In the process of learning the professional knowledge of advanced algebra, create a variety of teaching activities and scenarios, encourage students to use division of work and cooperation to solve problems together, so that students can deeply understand the importance and innovation of team cooperation, and pay attention to division of labor and joint efforts in team cooperation.

Innovative thinking: By transforming practical problems into mathematical problems, guide students to use existing knowledge to start from the curriculum and solve practical problems with creative thinking methods. In addition, the reform and innovation of professional courses and ideological and political theory courses constantly enhance the ideological, theoretical, affinity and pertinence of ideological and political courses, and constantly increase the technical, innovative and pioneering nature of professional courses.

Cultural Heritage: in the first century A.D. , the The Nine Chapters on the Mathematical Art first introduced methods for solving systems of equations, the equivalent of today’s matrices, determinants, and vectors, chinese culture has a long history, and students are encouraged to pay attention to the inheritance of Chinese culture.

3. The follow-up development and prospect of ideological and political education and higher algebra

During the implementation of the ideological and political curriculum, the team members regularly organized the study of the ideological and political curriculum. Through the study of classical theory books, the discussion of hot issues and the sharing of teaching difficulties, the understanding of the researchers on the ideological and political elements was enhanced, and the teaching level and the level of propaganda and education were steadily improved. However, the path of curriculum ideological and political education is diffuse. It is urgent to develop a pilot program of curriculum ideological and political education, explore replicable and referential experience and practices, and explore the following aspects:

3.1 Strengthen the construction of the ideological and political team

Pay attention to the construction of the ideological and political team of the curriculum, strengthen the ideological and political education and training of higher algebra teachers, carry out the training of ideological and political education skills, guide teachers to establish the ideological and political concept of the curriculum, take ideological guidance and value shaping as the goal, not only attach importance to knowledge teaching and ability training, but also strengthen the guidance of values. Actively carry out the reform of ideological and political education in the curriculum, make full use of the role of old teachers and new teachers, and truly integrate knowledge teaching, ability training, and thought guidance into the teaching process of higher algebra courses.

3.2 Reform teaching means and methods

Actively implement the student-centered teaching concept, reconstruct the learning process, and promote the reform of classroom teaching mode. The mixed teaching mode is adopted in combination with the ideological and political integration point of the curriculum, and the 4F guidance method is actively introduced. The teaching reform is carried out by such methods as classroom division, maker teaching method, topic-based teaching method, comparative teaching method, micro teaching method, etc. Pay attention to the use of modern information tools to assist teaching, use information platforms such as Learning Link to release teaching tasks before classes, and put forward some ideological and political issues related to professional teaching content. In the class, the ideological and political elements

of the course are reasonably displayed and introduced according to the teaching content to guide students to participate deeply, activate the classroom atmosphere, and increase interest and innovation. After class, information feedback and data statistics were conducted through small programs such as Jindao and Xuotong to reflect on the curriculum and teaching and make continuous improvement. Teachers pay attention to the emphasis on different levels of teaching objectives, guide students to complete the expansion activities from easy to difficult, carry out differentiated teaching, and carry out curriculum ideological and political education in accordance with the professional content in teaching, so that students can deeply participate in the teaching process, achieve the common success of teachers and students in the classroom, let ideological and political elements penetrate into the curriculum teaching.

3.3 Fully tap the ideological and political elements of higher algebra courses

The higher algebra course is the extension and expansion of middle school algebra. There is no difference in the depth and breadth of content. Its ideas and methods for dealing with mathematical problems are more logical and abstract, and the ideas and skills for solving problems are also unique. In the process of learning, teachers should integrate the ideological and political concepts into the teaching process, deeply explore the ideological and political elements in the curriculum, combine the characteristics of the curriculum itself, emphasize the strictness of logical reasoning, and the diversity of research methods, which can become the entry point of our curriculum ideological and political, and also show that higher algebra provides an opportunity for curriculum ideological and political. Secondly, with the combination of facts, facts, and real scenes, we will update them in real time, take the global height and scientific and technological progress as an opportunity to show the greatness and beauty of mathematics, and create a complete teaching case library. Revise the teaching syllabus, add ideological and political requirements, form a curriculum ideological and political system and continue it regularly, so as to truly implement the idea of integrating ideological and political ideas into professional curriculum teaching.

3.4 Embody the cultural value of mathematics

Culture and history are always inseparable. The process of guiding students to learn the history of mathematics, fully experiencing the development of higher algebra courses, and showing the original appearance and panorama of mathematics is more a process of students' understanding of cultural characteristics and value orientation. In the process of learning higher algebra courses, the introduction of relevant mathematical history is integrated to help students accumulate cultural heritage, guide values, establish patriotism, enhance national self-esteem and self-confidence, and improve students' sense of responsibility.

4. Conclusion

During the exploration of higher algebra and ideological and political education, we emphasized that the ideological and political education needs of the curriculum should conform to the students' cognitive laws, deeply explore the ideological and political education content of professional courses, find the contact point for the integration of the two, constantly explore and innovate, constantly improve the teaching plan, take students as the center, carefully design teaching cases, adopt a mixed teaching mode, and adapt to the teaching methods of students' personality characteristics. In all aspects of teaching, we should make full use of the first and second classrooms to imperceptibly infiltrate the world outlook and values into students' life and learning. In the future work, we will focus on the practice, combine the teaching objectives of this major, further improve the existing teaching system, integrate the suggestions of curriculum ideological and political reform into the teaching details of each major, and play a positive role in promoting the reform, and finally achieve the effect of curriculum ideological and political reform.

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