

Integrating Traditional Chinese Culture into Teaching Practice and Exploration – Taking the Numerical Analysis Course as an Example

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Abstract: China's excellent traditional culture has a history of thousands of years, which will have a significant influence on students' thinking and behavior if integrated into teaching. In this paper, the Numerical Analysis course is taken as the research subject, and the main problems and causes of incorporating traditional culture as well as ideological and political education into teaching are analyzed. At the same time, as a way of integrating science into education, the strategy and specific implementation plan for the integration of traditional culture as well as ideological and political elements into numerical calculation methods are proposed. This provides a new idea and experience for basic mathematical courses in colleges and universities, which plays a role in traditional cultural, ideological, and political education curricula.

Keywords: Traditional culture; Teaching exploration; Numerical Analysis; Science-education integration

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1. Introduction

In China, higher education shoulders the important task of cultivating talents for national development and national rejuvenation. Curriculum ideology and politics is a new form of education that brings teachers together, runs through the entire educational process, and is organically integrated into the entire curriculum. By exploring the ideological and political elements of various types of courses, we can organically integrate ideological and political education into the main channel of teaching, and then realize the cultivation of morality.

2. Current situation of ideological and political construction

At present, local colleges and universities have begun to integrate ideological education into different aspects of teaching in various professional courses. For example, the basic subjects ^[1,2] and curriculum teaching practice ^[3,4] in the field of mathematics. At the same time, there are many applications in curriculum ideological and political reform ^[5], practice, and other aspects ^[6,7]. The integration of ideological and political education into professional courses combines the implicit and explicit functions of ideological and political functions and has also achieved certain results from teaching practice ^[5, 8-10]. However, there are several problems ^[11,12]. For example, the coverage of subjects in colleges and universities is wide, and

there is no unified template for ideological and political education ^[13]; moreover, the ideological and political education of each major has its own characteristics ^[14]. At the same time, ideological and political elements only focus on issues such as science and technology ^[15,16]; there is no joint effort to integrate with traditional Chinese culture ^[17-19], and there is no in-depth exploration of ideological and political elements ^[20]. At present, there are several problems in the teaching practice of basic mathematics.

2.1. Lack awareness of ideological and political education

Many teachers who teach basic mathematics lack awareness of ideological and political education. They believe that these courses have little to do with ideological and political education. Ideological and political education is emphasized in the teaching process of literature and history courses. At the same time, ideological and political education belongs to both ideological education and basic courses. The relevance is not significant. It is sufficient if basic mathematics courses are sound in theory and application.

2.2. Unsuitable ideological and political elements

The ideological and political elements of the curriculum are not introduced in place, thus leading to the rigidity of ideological and political content in the curriculum. In the process of teaching ideological and political courses, due to the lack of factors, such as course characteristics and professional characteristics, as well as the school's scientific research status, cultural orientation, regional cultural differences, and other characteristics, the integration of ideological and political elements is not effective, which in turn makes the ideological and political content of the course blunt, boring, and far-fetched. Ideological and political courses not only fail to have a good impact, but also have a high potential for causing widespread dissatisfaction among students.

2.3. Poor course planning

Ideological and political courses have not achieved continuity and reasonable planning, and the entry point of ideological and political content is inappropriate. When many ideological and political courses were first launched, teachers were able to combine pictures and texts. With the passage of time and the lengthening of course duration, this practice became less and less relevant in the course of teaching, and eventually died out. This kind of anticlimactic style of work will greatly reduce the teaching content of ideological and political courses. It is also not conducive to the subsequent teaching of ideological and political courses, as well as the improvement of teaching content. Each professional class lasts 40 to 45 minutes; however, ideological and political elements are brought up in an inopportune moment. For example, ideological and political elements are added in a hurry when the class is about to be dismissed, or they are introduced at the beginning of the class. This not only fails to integrate and utilize ideological and political elements, but also wastes precious classroom time.

3. Integration and application of ideological and political content into the Numerical Analysis course

The Numerical Analysis course, introduced in this paper, shares many of the same qualities as strong basic subjects. This course is about using computers to solve various mathematical problems. If the course's ideological and political education is reasonably and successfully carried out, it will have a significant influence on improving the overall ideological and cognitive level of students majoring in science and engineering.

3.1. Curriculum ideological and political design ideas

The application of specific algorithms to scientific research and engineering practice is used as an example theme in the design of ideological and political courses, and ideological and political elements are

reasonably integrated to achieve “enhancing ideological and political” as well as “silent” natural integration effects. Based on the specific characteristics of the numerical analysis methods, along with scientific research examples, scientific research figures, engineering applications, etc. as the starting point, the knowledge points and ideological and political elements of the course are organically combined. At present, the research team of the college has sorted out and summarized the current ideological and political work on the basis of previous ideological and political education and teaching. At the same time, it has carried out teaching reform and teaching method innovation in consideration of the characteristics of various majors of the Integrated Schools of Ocean Sciences.

The construction idea of integrating ideological and political elements into the Numerical Analysis course is shown in **Figure 1**. Specific teaching ideological and political elements are reasonably interspersed into the design of the teaching process as shown in **Figure 2**.

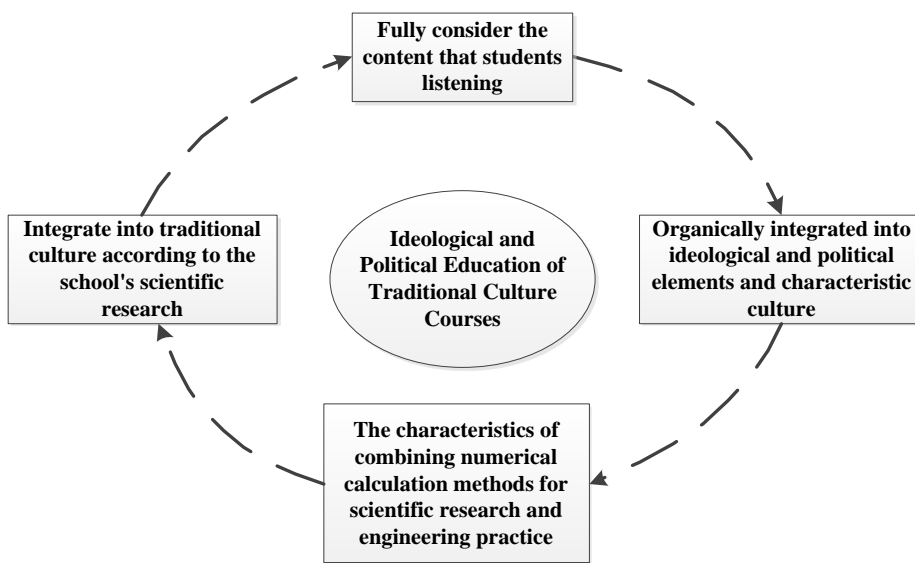


Figure 1. Ideological and political construction

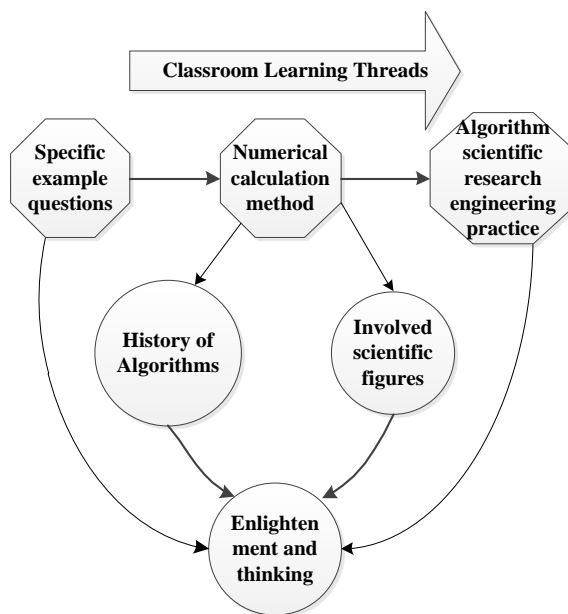


Figure 2. Content design of ideological and political courses

3.2. Curriculum ideological and political design methods

This section analyzes the numerical calculation method combined with the specific ideological and political element.

- (1) Integrate numerical calculation methods with the development of science and technology, cultivate students' sense of mission and responsibility, stimulate patriotism, and cultivate a sense of home and country. Introduce short videos of self-made courses in the introduction of each chapter to introduce modern technology. With the development of big data, artificial intelligence, and 5G information transmission technology, the commanding heights of science and technology have changed. The political elements are currently introduced into the course. By introducing real-world examples, such as the subsidiary of China's ByteDance, it has grown into a world-class company in just two years through the successful development of TikTok. The key to the company's software competitiveness lies in the video algorithm used by the software. Through vivid examples in life, students can truly appreciate the importance of learning this course.
- (2) Combine the basic theory of numerical calculation methods with application cases, and reasonably integrate ideological and political elements. When explaining the iterative method of linear equations to students, the simplified circuit diagram of the navigation chip is introduced, the current equations are deduced according to the circuit diagram, and the circuit current is solved by the Jacobian iteration method. From this, ideological and political elements are integrated. A small chip has a very complex internal structure and is composed of tens of millions of circuits. Such a small high-precision nm-level chip cannot be produced in China due to the lack the production tools – lithography machine. Only by learning knowledge and technology can we cultivate students' patriotism and mission in the process.
- (3) Reasonably integrate the history of mathematics and mathematics culture in China to cultivate national pride and cultural self-confidence. In the teaching of numerical calculation methods, the aesthetic education value of mathematics and the ideological and political elements are rationally and organically integrated to guide students to take root in China, inspire science and technology to serve the country, as well as stimulate students' enthusiasm for scientific research and their love for science. When learning polynomial calculation, the focus is on Qin Jiushao, an outstanding mathematician from the Southern Song Dynasty. His "Nine Chapters of Shushu" discusses the main achievements of traditional mathematics in China during that period, using it to enhance students' cultural self-confidence.

4. Strategies for promoting the implementation of ideological and political courses

4.1. Construction of the teaching staff

During teaching activities, further strengthen the ideological and political education as well as the training for basic course teachers, so that they can enhance their self-confidence in the approach, theory, system, culture, etc. from the source of cognition, further cultivate their own awareness of educating people, and learn from the ideology of "I love teaching, students, and education." In terms of professional knowledge, consolidate their professional basic knowledge, and set a positive value example for students while imparting knowledge. Transform the traditional concept that teachers are only responsible for imparting specific knowledge, and guide teachers to rationally use the opportunity of ideological and political courses to carry out ideological and political teaching and training in classroom. At the same time, various methods can be used to strengthen the reform of curriculum ideological and political teaching, and teachers are guided to integrate knowledge education, ability training, and thought leadership into the curriculum teaching of various basic courses through numerical methods.

4.2. Create an innovative new media education platform

In order to achieve the organic integration of ideological and political education with traditional culture, an

innovative new media education platform can be established based on the network platform, excellent traditional Chinese culture can be integrated into ideological and political education-related websites, and at the same time a campus website can be set up. In terms of diversity management, when disseminating excellent traditional culture, new media technologies can be used to realize the collection of network platforms, such as school Weibo and WeChat public accounts, as well as to realize a new media platform integrating education, management, and services. Disseminate traditional and local culture information to both students and teachers, foster excellent online and offline interactions between teachers and students, overcome time and space constraints, as well as guide students to form correct ideas and spread correct cultural connotations.

4.3. Build an integrated teaching platform for teachers and students

The development of ideological and political education in colleges and universities is the main carrier for integrating excellent traditional Chinese culture into campuses and infiltrating students' brains. Teachers who carry out ideological and political education in colleges and universities shoulder a huge responsibility. Based on relevant surveys, it is found that most teachers adopt the "indoctrination" teaching method in ideological and political courses. Although this method is a relatively positive traditional teaching method of theoretical knowledge and can be used to guide students' thoughts, this teaching method is relatively boring, and students are prone to resistance in the learning process. In addition, there are many theoretical contents, which have little to do with practical problems, and the acceptance level of students is generally low. Therefore, integrating excellent traditional Chinese culture into ideological and political education in colleges and universities requires teachers to improve their teaching methods and establish an integrated teaching platform for both teachers and students according to the nature of education.

5. Conclusion

The traditional cultural, ideological, and political development of university-level numerical analysis courses aims to explore the ideological and political resources of relevant basic mathematics courses through teachers. Hence, it is imperative to integrate science into education, combine teaching theories with specific cases, and cultivate mathematical culture in the process. In order to provide reasonable ideological and political education to college students, these teaching methods can guide students to form a correct outlook on life and values, as well as cultivate their feelings for their home and country.

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Disclosure statement

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References

- [1] Chen A, Zhang Z, 2019, Teaching Research and Discussion on "Numerical Analysis" Course of Artificial Intelligence Major. *Computer Education*, 2019(10): 71-73.

- [2] Qin H, Xu H, 2019, The “Touch Points” of College Mathematics Curriculum Ideology and Politics and the Construction of Teaching System. *Chinese University Teaching*, 2019(9): 61-64.
- [3] Liu S, 2016, Teaching Research and Practice of “Numerical Analysis” Based on Innovation and Application Ability. *University Education*, 2016(2): 130-131.
- [4] Gong D, Peng Y, Zheng S, 2019, Practice and Ideas of Teaching Reform of “Numerical Analysis” Course. *Mathematics Learning and Research*, 2019(19): 52-54.
- [5] Jia X, Wang L, Sun X, et al., 2021, Proceedings of the 2021 International Conference on Modern Educational Technology and Social Sciences (ICMETSS 2021), July 16-18, 2021: Course Ideological and Political Education Incorporated into Teaching Practice and Exploration of Numerical Computation Method. Atlantis Press, 103-106.
- [6] Lian H, Lei X, Luo W, et al., 2021, Exploration of Teaching Reform of “Mathematical Physics Equations” Course in Engineering in the New Era. *China Geological Education*, 30(04): 71-74.
- [7] Liu X, 2021, Teaching Reform and Practice of Mathematical Physics Equations Course. *Heilongjiang Science*, 12(07): 122-123.
- [8] Sun G, 2021, The Mining and Application of “Ideological and Political Elements” of Professional Courses Under the New Crown Pneumonia Epidemic. *Journal of Zhongzhou University*, 38(02): 92-96.
- [9] Wang G, Luo P, 2021, Exploration and Practice on Incorporating the Concept of Course-based Ideological and Political Education into the Teaching of Higher Algebra. *The Science Education Article Collects*, 2021(07): 78-80.
- [10] Tang B, Jia X, Shao Q, et al., 2022, Course Ideological and Political Integration: The Exploration and Practice of “Marine Chemistry” Teaching. *Guangdong Chemical Industry*, 49(4): 229-230.
- [11] Lu L, 2021, Discussion on the Important Role of Traditional Culture Education in Ideological and Political Education. *Chinese Character Culture*, 2021(24): 195-196.
- [12] Tian F, 2021, Research on the Practice of Integrating Excellent Traditional Culture into Ideological and Political Education in Colleges and Universities. *Modern Vocational Education*, 2021(38): 140-141.
- [13] Wu Q, Liu J, 2020, Research on the Integration of Chinese Excellent Traditional Culture into Ideological and Political Education in Colleges and Universities. *Legal System and Society*, 2020(15): 243-244.
- [14] Chen H, Yang J, 2021, Exploration and Practice of “Course Ideology and Politics” in the General Course of “Chinese Traditional Culture” in Science and Technology Colleges. *Journal of Lanzhou Jiaotong University*, 40(02): 156-161.
- [15] Zhu G, 2020, Research on the Current Situation and Path of the Integration of Chinese Excellent Traditional Culture in Ideological and Political Education in Colleges and Universities. *Southern Journal*, 2020(03): 103-105.
- [16] Liu X, 2021, Research on the Path of Chinese Excellent Traditional Culture to Enhance the Affinity of Ideological and Political Education in Colleges and Universities. *Times Report*, 2021(09): 110-111.
- [17] Zheng Q, Zhou Y, 2020, Research on the Integration of Chinese Excellent Traditional Culture into Ideological and Political Education in Colleges and Universities. *Education and Teaching Forum*, 2020(48): 84-86.
- [18] Zhang H, 2019, Research on the Integration of Chinese Excellent Traditional Culture into Ideological and Political Education in Colleges and Universities, Hunan University of Science and Technology.

- [19] Dai X, 2021, Research on the Path of Integrating Chinese Excellent Traditional Culture into Ideological and Political Education in Colleges and Universities, Xihua University.
- [20] Yan X, 2021, Mining and Application of Ideological and Political Elements in Science and Engineering Courses. Journal of Fuzhou University (Philosophy and Social Sciences Edition), 35(05): 109-112.

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