ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202504_8(4).0023

Teaching Design and Practice of Ideological and Political Education in Cartography Course

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Abstract

In the context of ideological and political education, the course "Cartography" serves as a core foundational subject for majors in surveying, remote sensing, and geographic information science. The integration of ideological elements is a crucial aspect of the course's teaching methodology. This paper first analyzes the existing issues in curriculum-based ideological education within this course. It then explores the incorporation of ideological elements into the course content, further optimizing it to identify effective entry points for integrating ideology with academic material. Building on this foundation, a new teaching model has been designed and implemented in the course instruction. By employing case studies and project-based practices, we have organically fused professional knowledge with ideological education. This approach has enhanced students' sense of national identity and responsibility while effectively improving their overall cultural literacy, thereby achieving commendable educational goals centered around moral development and character building.

Keywords

Course Ideology and Politics, Cartography, Ideological and Political Case.

1. Introduction

In May 2020, the Ministry of Education issued the "Guiding Outline for the Construction of Ideological and Political Education in College Courses", which proposed that efforts should be made to build ideological and political education into college courses, giving full play to the role of each course in shaping students' worldviews, outlooks on life and values. Therefore, ideological and political education, as a crucial part of the educational process, should be integrated into the daily teaching and learning activities of colleges and universities while they are cultivating students' professional skills. This will help achieve the goal of educating all students throughout the entire process and in all aspects, and enhance their comprehensive humanistic qualities.

As a traffic-oriented applied engineering university, our school was approved as a pilot unit for the construction of a transportation power by the Ministry of Transport in 2024. Therefore, we must closely focus on the development of new engineering disciplines and cultivate high-quality, compound new engineering talents with strong professional and technical innovation capabilities and high humanistic qualities. Combining the school's traffic characteristics and the close relationship between maps and people's lives, in the "Cartography" course, we analyze the impact of map development on individuals and society through real-life cases, which can more easily resonate with students and make the ideological and political education goals of the course easier to achieve. Based on years of experience in exploring and practicing ideological and political elements in this course, the teaching team has further optimized the ideological and political cases of the course and designed the teaching plan, exploring the ways and methods of integrating ideological and political education into the course to better promote ideological and political education.

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2. Analysis of Existing Problems

The course of "Cartography" is a core foundational course for majors such as surveying, remote sensing and geoscience. It mainly focuses on spatial information visualization and studies the expression, processing, analysis, and application of spatial information. It is an interdisciplinary and technically strong application course that plays a bridging role in the professional curriculum group. The purpose is to cultivate technical talents with good theoretical literacy in cartography, strong skills in map making and map application.

In the past teaching process, although there was some ideological and political content in the curriculum, which was reflected in the curriculum quality standards (teaching syllabus), only the learning objectives of ideological and political education were mentioned, and the specific integration points were not clearly pointed out. From the specific teaching process, teachers often pay more attention to the cultivation of students' theoretical and professional technical abilities in the curriculum, and there is a lack of exploration, depth, and coverage of ideological and political elements. When integrating ideological and political content into curriculum teaching, it is often stiff and unnatural, and the integration process is not smooth enough. The deliberate nature is strong, which can cause students' resentment and make it difficult to achieve the effect of ideological and political education.

3. Exploration of Ideological and Political Elements in Courses

To achieve the ideological and political goals of subtly improving students' humanistic literacy, enhancing social service awareness, inspiring patriotic enthusiasm, and strengthening sense of responsibility and mission in cartography course teaching, it is necessary to closely integrate knowledge and ability goals in teaching, find the best fit between course content and ideological and political elements, appropriately and naturally integrate course ideological and political elements, and form a butterfly effect of collaborative education. The exploration of ideological and political elements in courses can be considered from the following aspects.

(1) History of Map Development

Maps have a long history of development, and in the process of their origin, formation, and development, a large number of outstanding map scholars and excellent map achievements have emerged both in ancient and modern times, both at home and abroad. China can even be traced back to more than 4500 years ago, as recorded in books such as "Shan Hai Jing" and "Shui Jing Zhu". During the Wei and Jin dynasties, Pei Xiu, the father of scientific cartography, pioneered the epoch-making theory of cartography known as the "Six Forms of Cartography". He authored the "Map of Yugong Regions" and the Song dynasty cartographer Shen Kuo compiled the "Map of States and Counties in the World". Famous contemporary Chinese cartographers such as Academician Wang Jiayao and Academician Chen Shupeng have made outstanding contributions to the development of map theory and mapping technology in China. The integration of these outstanding figures in the field of cartography can provide a wealth of vivid and rich materials for carrying out ideological and political education in the curriculum, enhance students' cultural confidence, and motivate them to become practitioners of socialist cultural confidence in the new era.

(2) Map making technology

With the rapid development of mapping technology, mapping technology has evolved from traditional measurement based mapping to modern satellite remote sensing mapping and unmanned aerial vehicle mapping, such as China's Beidou satellite, Fengyun satellite, DJI unmanned aerial vehicle and other high-tech means of obtaining map data. The development of deep space and deep-sea exploration technologies, such as Chang'e, Zhurong, Tiangong Space Station, Jiaolong, etc., has provided technical support for map data acquisition. The

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development of map information visualization from traditional 2D map production to modern real-life 3D maps, holographic maps, modern new media maps, etc. is inseparable from the development of technology in China. A large number of excellent domestic software with map mapping related functions have emerged, such as MapGIS, SuperMap, etc. The integration of these cases can greatly enhance students' sense of national pride and strengthen their patriotic emotions.

(3) National territory and sovereignty

Maps have inherent political attributes and are the most important form of representation of a country's territory. They are an important tool for declaring national territorial sovereignty, reflecting national political propositions, and conveying national diplomatic positions and policies. The emergence of some Internet problem maps has seriously damaged China's territorial sovereignty. If they are used carelessly, they will have an irreversible negative impact on education and teaching. Therefore, authentic maps issued by authoritative departments such as China Map Publishing House should be used in teaching, such as the new vertical version of China Map, which rigorously and accurately draws the nine dash line of the South China Sea, ocean islands and other land and sea territories of China. This can enable readers to have a comprehensive and intuitive understanding of the entire map of China, which is conducive to the establishment of national awareness of territory and ocean.

(4) Geographic information confidentiality

As a carrier and transmission tool of various geographic information, maps depict results that are mostly state secrets, involving a wide range and scope, and are closely related to national security strategies. They are an important area of concern for hostile forces. Especially with the popularization of Internet map application, all kinds of map products have been widely used in all aspects of social economy. Once the relevant map products involve sensitive content or illegal mapping incidents occur, it will seriously endanger China's national defense security. Therefore, we can implement ideological and political education on national defense security and improve students' knowledge and awareness of consciously maintaining national security in combination with the application of Internet map services, the Law of the People's Republic of China on Guarding National Secrets, the relevant regulations on map product confidentiality, and the relevant regulations on opening map content. To closely integrate with the transportation characteristics of our school, we can highlight the technical regulations on map confidentiality, the content that cannot be measured or represented in navigation maps, and other relevant provisions of the national regulations on navigation maps, in order to enhance students' awareness of geographic information confidentiality, report illegal mapping in a timely manner, and consciously safeguard national security.

(5) Patriotism

By utilizing the production of relevant 'red maps', patriotic education content such as major events, battles, the Long March route, and the revolutionary process of the Chinese revolution will be presented in a visual, dynamic, and new media manner, more vividly showcasing revolutionary history and expanding and innovating patriotic education methods. At the same time, practical activities such as creating maps of red culture tourism, recommending hometown maps, Jinan's red culture, and intangible cultural heritage can be carried out. Telling good map stories is conducive to promoting revolutionary and national spirit, and promoting students' ideological and moral construction.

(6) Craftsmanship and Social Responsibility

The map has made great contributions to social and economic development, especially in today's digital economy, three-dimensional reality, rural revitalization, the the Belt and Road, and the Maritime Silk Road. The spatiotemporal big data digital base enables the development of various industries. Based on the transportation characteristics of our school, we can focus on

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202504_8(4).0023

integrating projects that graduates of our major participate in, such as land survey, Yellow River Basin development strategy, smart transportation, HongKong-Zhuhai-Macao Bridge construction, Jinan Metro construction, etc., to cultivate and enhance students' sense of identity and industry pride in their profession, enhance their social responsibility, and strengthen their sense of mission. Green mountains and clear waters are as valuable as mountains of gold and silver. The course can combine the production and display of thematic time series maps on air, soil, water pollution, and protection to enhance students' profound understanding of the community with a shared future for mankind. Starting from themselves, students can devote themselves to environmental and ecological protection.

4. Content Design of Course Ideological and Political Education

Based on the exploration of ideological and political elements in the above cartography course, combined with the characteristics of the cartography course content, the ideological and political teaching content of the course is designed, and the entry point of the ideological and political elements guided by the "map" is identified. The course knowledge module is benchmarked to achieve the integration of professional knowledge imparting and ideological and political education. As shown in Table 1.

Table 1. Teaching Content Design of Ideological and Political Elements in Cartography Course

knowledge module	Course content	Integration points of ideological and political elements	Ideological and political goals
Basic knowledge	Maps and cartography	Introduce the achievements of China's map industry according to the development process of cartography, and introduce outstanding Chinese cartographers and their typical map works; Introduce vertical maps of our country; Video playback: Academician Wang Jiayao: The story behind the map;	Enhance national pride, cultural confidence, awareness of national territory, and professional identity
Mathematical foundations	Earth ellipsoid Map Projection and Coordinate System Earth control Ellipsoid and its parameters	Map projection distortion contradiction; Introduce the significance of setting the national geodetic origin and leveling origin; Determination of Mount Everest elevation	Dialectical thinking; Independent innovation and craftsmanship spirit, teamwork spirit, and hard work spirit; Enhance national defense and security awareness
Map data source	Mapping data Acquisition and processing	The Beidou satellite network has been successfully established; Domestic unmanned aerial vehicles, deep space and deep-sea exploration, and survey of Diaoyu Islands Domestic remote sensing satellite, introducing academician Li Deren, winner of	Enhance patriotism and mission responsibility Enhance national territorial and security awareness

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		the highest national science and technology award Video animation: Illegal Surveying Incident	
cartographic generalization	Cartographic synthesis method	Exaggeration and displacement in graphic synthesis; Introduce domestic mapping platform software	Rigorous and pragmatic thinking with dialectical thinking National pride and mission responsibility
mapping	Regulations on national boundary symbols Compilation of thematic maps (collections) The emergence of the 'problem map'	The political significance of the correct positioning of national map mapping standards and border symbols, and resistance to problematic maps Guide the standardized use of maps, without any mistakes Tell the story of the Red Map (Collection) Realistic 3D, the Belt and Road	Enhance patriotism and patriotism Territorial awareness, territorial awareness Consciousness of a community with a shared future for mankind Love hometown aesthetic consciousness
Map Applications and Services	Internet map service Basic Geographic Information Services Emergency relief services	Declassification of sensitive information of Internet map Location advantages of HongKong- Zhuhai-Macao Bridge and Xiong'an New Area construction Land and Resources Survey, Yellow River Development Strategy Emergency disaster relief (earthquakes, floods, etc.)	Enhance national security awareness, legal awareness, sense of mission, and responsibility; Cultivate the spirit of great country craftsmen; Enhance professional ethics and sense of professional identity;
Polar topographic mapping	Antarctic mapping Arctic mapping	Polar scientific expedition Establishment of Polar Stations The production and significance of polar topographic maps	Safeguarding National Polar Rights and Interests Showcasing national strength and pride The spirit of hard work, teamwork, and dedication
Map product security	National laws and regulations Confidentiality Regulations for Map Products	Confidentiality level of topographic maps in China Confidentiality treatment of geographic information products National laws and regulations	Enhance national security awareness and map product confidentiality awareness Enhance professional ethics and abide by laws and regulations

5. Design of Course Ideological and Political Teaching Mode

According to the ideological and political teaching objectives of the cartography course (Table 1), changes should be made to the course teaching compared to before. In terms of teaching mode, we consider starting from teaching methods and means, classroom organization, course

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practice, homework, ideological and political teaching evaluation, etc. On the basis of achieving the knowledge goals of the course, we aim to enhance students' emotional experience in the course learning process and achieve value guidance.

(1) Change teaching methods and tools

Change the traditional teaching method of "walking parallel" between course knowledge content and course ideological and political content, grasp the entry point of course ideological and political content, use cases as guidance, create problem scenarios, stimulate students' learning interest and independent thinking, cultivate and improve their ability to analyze and solve problems, deeply understand the theoretical thinking and dialectical thinking behind problems and knowledge, and form an introduction connection summary teaching method for course ideological and political education, avoiding the rigid and deliberate introduction of traditional course ideological and political education. Make full use of the ideological and political resources of the "Internet plus" course, and appropriately introduce the corresponding ideological and political videos, such as videos and animations of cartographer interviews, map confidentiality, illegal surveying and mapping, etc., to arouse students' resonance.

(2) Refactoring classroom organizational form

Under the guidance of ideological and political case studies, we will change the traditional single classroom theoretical lectures where teachers chatter incessantly. Students will be included in role-playing, and group discussions will be conducted based on the cases. Finally, group members will be randomly selected to explain and share their own experiences and feelings, with the assistance and guidance of the teacher. This can fully mobilize students' enthusiasm, collide their thoughts in a empathetic way, and enhance their corresponding values.

(3) Immersive Course Practice

In the practical part of the course, map making can be combined with rural revitalization, poverty alleviation, revolutionary history, etc., allowing each student to move and tell the story behind the map. You can make full use of the holidays to retrace the path of "map stories". Through the stories behind maps, while consolidating the application methods of maps, you can also understand and "write" outstanding figures in map stories, thereby enhancing students' humanistic literacy.

(4) Homework

Comprehensive and open-ended assignments can be designed and arranged, such as combining current events and hot topics, researching deep space and deep-sea exploration, and the application of maps in low altitude economy. Through independent research, students can understand the forefront of China's related technology development, strengthen their patriotism, enhance their sense of national pride, and strengthen their sense of mission and responsibility to achieve the great rejuvenation of the nation. Students can also create their own "footprint map" through practical experience and travel experiences.

(5) Course ideological and political evaluation

Integrate ideological and political evaluation with curriculum evaluation, and evaluate students' learning situation from multiple perspectives. Taking into account students' participation in classroom activities, the quality of independently completed assignments, conversations with students outside of class, and implicit ideological and political questions in final exams, we will comprehensively evaluate the effectiveness of ideological and political education and social responsibility. At the same time, feedback from students can also contribute to the improvement of teachers themselves, continuously optimizing curriculum design and methods of ideological and political education.

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6. Practical Application Effect

With the help of the teaching content and classroom teaching mode of ideological and political elements in the above courses, the course team members have organically integrated them into classroom teaching and achieved good teaching results. Through feedback on students' classroom learning, the integration of ideological and political elements has significantly improved the classroom attendance rate, significantly increased classroom learning interest, significantly increased classroom activity and participation, and significantly increased the number of students who actively think. From the comprehensive assignments related to "Red Map", "I Draw My Hometown", "Mountains, Rivers and Waters I Walked Through" in the practical stage, students' enthusiasm for independently completing assignments has significantly improved, and the quality of homework completion has greatly improved compared to before.

Overall, the teaching goal of ideological and political education has been achieved, and students' comprehensive humanistic literacy has been greatly improved.

7. Conclusion

From the perspective of ideological and political education, the integration of ideological and political education into professional courses is undoubtedly a very important part of the teaching process. The course of cartography, as a core foundational course for majors such as geology, remote sensing, and surveying, plays a crucial role in establishing the subsequent professional knowledge system and cultivating humanistic literacy. The profound ideological connotation and value orientation contained in the course's ideological and political education inject strong spiritual motivation into students' educational growth process. Through the integration of ideological and political content in the course, students can not only master professional knowledge and skills, but also establish a correct outlook on life and values, enhance their sense of social responsibility and professional ethics, and comprehensively improve their comprehensive literacy. With a positive and full mental state, they can better realize their own value and contribute their own strength in the tide of social and economic construction.

Acknowledgments

The paper is supported by the Undergraduate Teaching Reform Research Project of Shandong Jiaotong University (Project Number: 2024YB06)

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