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The Exploration of Integrating Ideological and Political Education in the Course "Passive Medical Device Detection Technology"

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Abstract: Professional courses, which consume the majority of students' time and efforts in colleges and universities, are critically important for ideological and political education. Along with imparting professional knowledge, engineering courses should delve deeper into the philosophical thinking and scientific spirit contained in the teaching content, and focus on strengthening engineering ethics education. The goal is to cultivate professionals who embody the spirit of craftsmanship, strive for excellence, and possess a heightened sense of mission and social responsibility. For the course "Passive Medical Device Detection Technology" with distinct engineering characteristics, this article explores the methods and paths of extracting ideological and political elements from six dimensions: engineering ethics literacy, national strategic awareness, innovative scientific spirit, excellent traditional culture, legal awareness, and professional ideals and ethics, aiming to cultivate a group of future biomedical engineers who have both solid academic professional qualities and the lofty belief of serving the country with science and technology, and contribute to the country's medical and health cause.

1. Introduction

From a global perspective, university classrooms are undoubtedly the core venue for ideological and political education for college students. Their fundamental purpose is to cultivate successors who meet the needs of national development and the characteristics of the times. In China, ideological and political education organically integrating with professional courses, as an innovative education model, aims to foster morality and talents, and strives to cultivate successors to the cause of socialism with Chinese characteristics who care about the country and are determined to serve the people. In 2020, the "Guidelines for the Construction of Ideological and Political Courses in Higher Education Institutions" issued by the Ministry of Education further promoted the deepening and practice of this education strategy [1], prompting the concept of ideological and political education in courses to gradually penetrate into the classroom practice of each subject.

Although specialized ideological and political courses play a vital role in such education, professional courses, which occupy most of students' study time and course schedule, are the core of ideological and political education. Professional courses should deeply explore the course content and structure, and cleverly integrate ideological and political elements into the teaching of professional knowledge through reconstruction and integration. At the same time, they should be vigilant and avoid improper practices such as transplanting without adaptation and excessive implantation of patriotic education that is out of touch with the course content, so as to ensure the harmonious coexistence of ideological and political education and professional education [2].

"Passive Medical Device Detection Technology" is a core course for the third-year undergraduate students of the biomedical engineering major at the University of Shanghai for Science and Technology. Its distinctive medical and engineering cross-disciplinary characteristics have a profound impact on students' career planning and development. Therefore, it is not only necessary but also urgent to explore and implement ideological and political education in this course [3].

2. Course Characteristics and Ideological and Political Objectives

The course "Passive Medical Device Detection Technology" plays a key role in the disciplinary system. On the one hand, it helps students to apply the basic knowledge of physics, chemistry, biology and medical devices to build a theoretical framework for testing and evaluation experiments. It deepens students’ understanding and application of professional knowledge, and improves their experimental operation skills. On the other hand, through practical teaching, the course gradually cultivates students' ability and literacy (e.g. quality inspection and regulatory supervision of passive medical devices) as well as professional skills (e.g. reading standards and writing test reports). Its application background is wide, closely fits actual needs, and has a distinct practice-oriented feature [4].

This article explores how to effectively integrate the elements of curriculum ideology and politics into the course "Passive Medical Device Detection Technology", with reconstructing the teaching design based on this, strengthening engineering ethics education, and cultivating students' pursuit of excellence and excellence. A comprehensive approach is proposed to prioritize students' developmental needs by optimizing the course setting, and implementing an online and offline hybrid teaching model. Such hybrid model aims to cultivate future biomedical engineers who have both solid professional literacy and the ideal of serving the country with science and technology.

3. Extraction of Ideological and Political Elements

Ideological and political education in courses is by no means limited to superficial patriotic education. It cannot be "formalized" or "forcibly implanted". Instead, it is necessary to deeply explore the ideological and political connotations in the essence of the course and teaching methods to promote the all-round development of students, covering all aspects of morality, intelligence, physical fitness, aesthetics, and labor. Teachers of engineering courses must not only accurately impart professional knowledge, but also infuse ideological and political elements into teaching seamlessly. This is a more arduous challenge for every teacher.

This course focuses on the quality and safety testing of disposable sterile medical devices and implantable devices. The ideological and political elements can be extracted and integrated from the following dimensions:

(1) Cultivation of engineering ethics literacy

Given the special nature of passive medical devices, this course attaches great importance to students' engineering ethics education. By emphasizing the importance of medical device design and testing in protecting people's lives and health, students' sense of reverence for life and social

responsibility are cultivated and strengthened. In-depth discussions on ethical issues in animal experiments and clinical trials, especially the safety and effectiveness evaluation of innovative medical devices, allow students to understand the humanitarian spirit and people-oriented care. At the same time, regarding the disposal of disposable medical devices, students are guided to think about sustainable development and ecological civilization construction from the dual perspectives of academic frontiers and social concerns, and thus deeply understand the green development concept and policies.

(2) Enhancement of national strategic awareness

As a key part of the medical and health system, the development of passive medical devices is directly related to the well-being of the people. The course reviews the growth of Chinese passive medical device industry, from dependence on imports to domestic substitution, and then to the occupation of the international market, aiming to inspire students' national pride and self-confidence. Under the background of the "big health" strategy, students are directed to pay attention to national policies and people's livelihood needs, such as medical insurance centralized procurement policies in promoting the universalization of medical devices, which helps to strengthen their belief in the path of socialism with Chinese characteristics. Meanwhile, by comparing and analyzing the gaps in the field of innovative medical devices at home and abroad, and exploring China's international influence in the formulation of testing technology standards, students could further understand the close connection between the fate of the country and personal development, and realize their sense of mission and urgency to serve the country with science and technology.

(3) Stimulation of innovative scientific spirits

Scientific and technological innovation is the core driving force for the development of the passive medical device industry. Taking domestic independent brands as examples, the course demonstrates the leading role of innovation in industrial development and cultivates students' awareness of scientific and technological innovation and the spirit of the times. In view of the continuous progress of passive medical device technology, students are encouraged to actively explore new testing methods and standards, and understand the significance of continuously updating international and national standards. These contents intends to cultivate innovative talents who will lead the development of the industry in the future.

(4) Integration of excellent traditional culture

By combining engineering courses with excellent traditional Chinese culture, students can feel the charm of the wisdom of Chinese sages in scientific research settings, resulting in the enhancement of their cultural identity and confidence. For example, when explaining physical performance testing, the saying "a slight deviation may lead to a great mistake" is quoted to emphasize the importance of experimental accuracy. Using explosion accidents as a warning, the principle of "preparedness ensures success; lack of it leads to failure" is used to strengthen students' experimental safety awareness and risk assessment capabilities. Besides, the learning attitude of "learning without thinking is useless, and thinking without learning is dangerous" is advocated, and students are encouraged to closely combine course learning with critical thinking to achieve the internalization and sublimation of knowledge.

(5) Reinforcement of legal awareness

The quality and safety of passive medical devices are undoubtedly highly valued, and the relevant regulatory system is increasingly improved. The course incorporates the content of medical device supervision and management regulations, registration and filing regulations, etc. to ensure that students can operate legally and compliantly in practice. At the same time, the topic of intellectual property protection awareness is introduced into the course, leading students to realize the importance of intellectual property protection for innovation, learn to use patents and other means to protect their own rights and interests, and respect the intellectual achievements of others.

(6) Shaping of professional ideals and ethics

In the teaching process, students are guided to think about the importance of the safety, accuracy and reliability of passive medical device testing to protect the rights and interests of patients, thus establishing lofty professional ideals to promote the progress of the industry. Furthermore, students are taught to adhere to the bottom line of honesty and morality, ensure the authenticity and objectivity of the test data, and resolutely resist fraud. With the spirit of craftsmanship that strives for excellence, students, as future professionals, must make sure that no substandard products reach the market and pose a threat to people's lives.

4. Implementation Strategies of Ideological and Political Education

(1) Deepening classroom interaction, observation and evaluation

In every link of classroom teaching, including practical operations, teachers should carefully observe and record students' learning dynamics and behavioral performance. Cleverly designed question guidance, group cooperation discussion and other forms, can help to fully stimulate students' enthusiasm for active learning and internal motivation. Students' acceptance and understanding of ideological and political elements, as well as their ideological collisions and in-depth thinking during communication, provide an empirical basis for subsequent optimization of ideological and political education.

(2) Scientific analysis and improvement plan design

Based on detailed classroom observation results, teachers should objectively analyze the implementation status of ideological and political education in this course, and accurately identify existing problems and shortcomings. A comprehensive approach has been taken to propose a targeted, content-rich, and diverse set of plans for improving and enriching ideological and political education by extensively consulting pertinent literature, conducting in-depth interviews with experts and educators in the field, and administering questionnaire surveys to students. These plans aim to substantially enhance the effectiveness and appeal of ideological and political education initiatives.

(3) Innovative hybrid teaching mode

A new model of ideological and political education that combines online and offline teaching has been actively explored and practiced, making full use of the advantages of modern information technology, such as video presentation, online interactive quiz, virtual group discussion and other diversified teaching methods, to inject new vitality into ideological and political education and enhance its engagement and interactivity. A post-class feedback mechanism can be established to encourage students to actively respond to teaching effects, and helps to continuously optimize teaching strategies through teaching reflection and adjustment, so as to improve teaching quality and ideological and political education level.

5. Conclusion

This article explores the organic integration of ideological and political elements and professional knowledge in the course "Passive Medical Device Detection Technology", aiming to inspire students' national pride and cultivate their awareness of scientific and technological innovation and the spirit of excellence in craftsmanship. Relying on advanced teaching platforms, this course successfully implemented an online and offline hybrid teaching model, and used a variety of online communication tools to achieve instant answers to students' questions and efficient collection of teaching feedback, laying a solid foundation for the refined management and continuous optimization of the teaching process.

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References

[1] Ministry of Education of the People's Republic of China. (2020) Notice of the Ministry of Education on Printing and Distributing the Guidelines for the Construction of Ideological and Political Courses in Higher Education Institutions. JG No. 3.

[2] Zhang, M., Wang, S., Yan, S., Zhou, Y. and Wang, C. (2023) The Exploration and Practice of Integrating Ideological and Political Education into Engineering Major Course—Taking "Medical Device System Design" as an Example. Progress in Biomedical Engineering, 44, P209-215.

[3] Lin, W. (2022) Preliminary Study on the Ideological and Political Design of Passive Medical Device Testing Technology Courses in Higher Vocational Colleges. Qianwei, 6, P172-174.

[4] Xu, X. (2007) Passive Medical Device Detection Technology. Science Press, Beijing.