

# Integrating Ideological and Political Education into the Pathogen Biology Curriculum: Promoting the All-Round Development of Nursing Students through Diversified Teaching

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**Abstract:** In order to better implement the “Three-Dimensional Education” and cultivate high-quality nursing talents, the integration of ideological and political education into the pathogen biology curriculum promotes curriculum reform and application. This article explores the use of various teaching methods and means in the teaching process of pathogen biology under the guidance of ideological and political education, aiming to stimulate students’ learning interest, cultivate their autonomous learning ability, independent thinking, problem-analyzing and problem-solving abilities, and thus improve their comprehensive qualities and medical professional literacy.

**Keywords:** Pathogen biology; Curriculum-based ideological and political education; Diversified teaching; Comprehensive quality

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## 1. Introduction

Pathogen biology is a basic compulsory course for various majors in medical colleges. It integrates multiple courses and covers knowledge about the morphology, epidemiology, pathogenesis, prevention, and treatment of pathogens. The knowledge points are complex, and the curriculum has a high degree of integration, with strong theoretical, practical, and applied characteristics. In the traditional teaching mode, students have a poor overall understanding of pathogens, lacking logic, innovation, and high-order thinking. At the same time, they cannot understand the formulation of personal and national epidemic prevention policies for corresponding diseases.

To solve these problems, it is necessary to adopt innovative interactive teaching methods to stimulate students’ learning interest and promote their in-depth learning. Case studies from real life and the practical application of

knowledge can be introduced to emphasize the relevance and importance of pathogen biology in addressing real-world health challenges. In addition, combining group discussions, debates, and research projects can encourage students' critical thinking, problem-solving skills, and collaboration abilities<sup>[1,2]</sup>.

Furthermore, integrating the knowledge and principles of pathogen biology into clinical scenarios and practices not only cultivates a comprehensive understanding of pathogens but also develops the necessary skills and mindsets for future healthcare professionals<sup>[3,4]</sup>.

## **2. The necessity of curriculum-based ideological and political education**

Curriculum-based ideological and political education is a new model for talent cultivation in colleges and universities in the new era. It conducts ideological and political education through carriers such as professional courses and general education courses, combining knowledge education with ideological education to achieve the goals of whole-process and all-round education. Curriculum-based ideological and political education is an advanced teaching concept or an advanced teaching method<sup>[3]</sup>. To organically and naturally integrate ideological and political elements into teaching designs, corresponding adjustments need to be made to teaching methods, teaching technologies, and teaching resources. By integrating various teaching resources and means, teaching should be tailored to different students without being restricted by forms. Integrating traditional lectures, multimedia teaching, case-based teaching, problem-based teaching, and other teaching methods can enhance teacher-student interaction, cultivate students' patriotism, international vision, scientific spirit, and humanistic qualities, and guide students to take the first step correctly in their medical studies<sup>[5,6]</sup>. Looking at the essence through the appearance, curriculum-based ideological and political education is exactly the catalyst and compass for curriculum reform, effectively improving students' learning experience and truly achieving the "trinity" educational goal of knowledge transfer, ability shaping, and value guidance<sup>[7,8]</sup>.

## **3. The two-way integration of curriculum-based ideological and political education and diversified teaching**

Nursing is a position that has the closest contact with patients in clinical work. Contents such as normal flora, infection, disinfection and sterilization formation, prevention and control, and the collection and transportation of clinical specimens are of great significance to the nursing profession. Different teaching methods, such as introducing historical and social events, case-based teaching, constructing mind maps, and heuristic teaching, are used in teaching to mobilize students' learning interest and enthusiasm, and then cultivate their ability to analyze and solve problems independently.

In the introduction, the deeds of scientists are woven into small stories to present the brief history of the development of microorganisms. For example, Pasteur's swan-neck flask experiment and pasteurization method can be used to let students relate to the disinfection and preservation of dairy products and wine in daily life and discuss other common disinfection and sterilization methods. Lister's operating room disinfection method is the predecessor of modern aseptic operating rooms. Students can be guided to discuss and think about which links in aseptic surgery require sterility and how to control it.

In the general introduction to bacteria, clinical cases of L-form bacteria are used to run through the basic structure and variation of bacteria, fully guiding students to think, discuss, analyze, and solve problems, deepening

their understanding and knowledge of the subject, and improving their problem-analyzing and problem-solving abilities. When talking about the target of penicillin in the cell wall structure, Professor Tong Cun, the first person in China's antibiotic research, can be introduced. His story can be used to guide students to establish patriotism and a sense of social responsibility. When explaining anti-infection and normal flora, social events can be used to trigger students' thinking about the emergence of superbugs and enhance their biosafety awareness of using antibiotics rationally<sup>[9]</sup>.

For the individual introduction of bacteria, the method of "case" → "problem-analysis" → "concept-integration" is mostly adopted, which is progressive and convenient for memorizing and understanding key knowledge. Medical records focus on the pathogens, clinical manifestations, differential diagnosis, prognosis, etc. of diseases. For example, when teaching pyogenic cocci, students are informed of a medical record one week in advance: Several students in a school experienced nausea and vomiting hours after dining in the cafeteria. Bacterial culture of the remaining food showed spherical-shaped bacteria, Gram-positive staining, and grape-like clusters. The culture could decompose mannitol. Students are asked to speculate on the possible pathogen, its main pathogenic substances, and how to prevent similar situations from happening again. Students can construct mind maps on their own through preview. In class, group representatives explain and analyze the pathogen and its biological characteristics, and then compare the main differences among *Staphylococcus*, *Streptococcus*, and *Neisseria* based on the mind maps. Through the prevention and treatment of diseases, students' awareness of professional protection and science popularization education can be enhanced, and their medical ethics and professional qualities can be strengthened.

When teaching about influenza viruses, animated videos can be used to vividly show the transmission routes and infection symptoms of the 2019 novel coronavirus, and its replication cycle and prevention and control measures can be introduced to deepen students' understanding and memory of the knowledge and enhance their confidence in the system and the country. The touching deeds of Gu Fangzhou, known as the "Sugar Pill Grandpa" who tested drugs on his own son, the advanced deeds of Zhong Nanshan, a heroic anti-epidemic figure who stuck to the front line, and the humanitarian assistance of medical staff in Africa during the Ebola epidemic can all guide young students to firmly adhere to the "Four-Fold Confidence" and cultivate their lofty medical ideals and humanitarian feelings.

#### **4. The second classroom practice facilitates the all-round development of students**

Medicine is a highly practical discipline that requires a solid professional knowledge base and the combination of theory and practice. Therefore, medical students must have a high level of professional qualities and medical ethics. To strengthen students' practical abilities, a series of social practice activities are carried out by combining the curriculum content with important holidays.

On the Infectious Disease Prevention and Control Day, students are actively organized to participate in prevention and control publicity and consultation activities in schools and surrounding communities. Students perform vivid situational dramas to present professional knowledge such as the pathogenesis, transmission routes, prevention measures, and treatment methods of infectious diseases in an easy-to-understand and highly infectious way to teachers, students, and community residents. At the same time, a publicity poster competition is held to encourage students to give full play to their creativity and painting skills and use colorful brushes to depict the key points of tuberculosis prevention and control. After the activities, these excellent works are displayed centrally so

that more people can benefit from them, further enhancing the public's awareness and prevention of tuberculosis. These practices not only exercise students' professional skills but also subtly inspire, influence, and cultivate their sense of social responsibility and mission<sup>[9]</sup>.

## 5. Conclusion

Outstanding nursing talents should not only have solid professional knowledge and excellent medical skills but also good humanistic qualities and professional spirits. Teachers play a crucial role in the cultivation of nursing talents<sup>[11]</sup>. First, teachers should adhere to the educational concept of unifying knowledge transfer and value guidance. When explaining professional knowledge, teachers should skillfully integrate the education of correct values, moral concepts, and a sense of social responsibility, enabling students to establish correct worldviews, outlooks on life, and values while learning professional knowledge, achieving the unity of explicit and implicit education<sup>[12]</sup>.

Second, teachers should unify classroom learning and extracurricular practice and actively organize students to participate in extracurricular practice activities, such as community health promotion and hospital clinical internships<sup>[7]</sup>. Students can experience the actual scenarios of nursing work firsthand, apply the knowledge learned in class to practice, further deepen their understanding and mastery of knowledge, and also cultivate their communication skills, teamwork abilities, and emergency-response capabilities in practice<sup>[13, 14]</sup>.

Finally, teachers should fully explore the educational resources and charm of pathogen biology, integrate ideological and political education into all aspects and links of student education. With teachers as the guide and students as the main body, teachers should continuously improve teaching methods and innovate teaching models to cultivate students' patriotism, international vision, scientific spirit, and humanistic qualities, contributing to the realization of the Healthy China 2035 initiative<sup>[15, 16]</sup>.

## Disclosure statement

The authors declare no conflict of interest.

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