



The Exploration and Practice of Curriculum Ideological and Political Education into the Whole Process of Molecular Diagnostics Teaching

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Abstract: This paper delves into the integration of curriculum ideological and political education throughout the entire process of teaching molecular diagnostics. Molecular diagnostics, as a pivotal course in the medical laboratory technology major, exhibits dual characteristics of natural science and humanities. In the context of the post-epidemic era, this paper analyzes the necessity of embedding curriculum ideological and political education within molecular diagnostics instruction. It explores methods to achieve a comprehensive educational approach, encompassing whole-course education, all-round education, and full education. The focus is on teaching design and methods that enhance the incorporation of ideological and political perspectives. This revised approach is intended to provide new insights for the effective realization of precise ideological and political education. The methodology and key findings emphasize the importance of seamlessly integrating ideological and political elements into the curriculum, enhancing student understanding and engagement with these concepts while mastering the technical aspects of molecular diagnostics. The paper also highlights innovative teaching strategies and the role of teachers in facilitating this integrated learning experience, underscoring the impact of this approach on student outcomes in both technical proficiency and ethical understanding.

Keywords: Molecular diagnostics, ideological and political education, post-epidemic era, moral education in class

Introduction

Molecular diagnostics is increasingly pivotal in the realm of medical laboratory technology[1], especially in the aftermath of the COVID-19 pandemic. This discipline, straddling the realms of natural science and humanities, demands an educational approach that is both multidisciplinary and holistic. The integration of ideological and political education within the molecular diagnostics curriculum is not merely an academic pursuit but a necessity in shaping socially responsible and ethically grounded medical professionals[2].

The evolving landscape of medical education, particularly in the post-pandemic era, underscores the need for this integration. Traditional pedagogical methods in molecular diagnostics have primarily focused on the transmission of technical knowledge, often overlooking the broader social, ethical, and political implications of medical practice[3].

The need for ideological and political integration in the teaching of clinical molecular biology laboratory techniques is more pressing than ever. Such integration is essential not only for developing a well-rounded worldview among students but also for instilling a sense of professional responsibility and ethical conduct[4,5].

This study aims to explore the integration of ideological and political education into the entire course of molecular diagnostics teaching. By analyzing the necessity and methods of this integration, the study seeks to provide new insights into implementing a comprehensive educational approach that encompasses technical knowledge, ethical reasoning, and social awareness. The ultimate goal is to align the teaching of molecular diagnostics with the broader objectives of cultivating responsible and ethically aware medical professionals capable of navigating the complexities of modern medical practice.

1 The Necessity of Integrating Ideological and Political Elements into the Teaching of "Clinical Molecular Biology Laboratory Techniques"

In the realm of clinical medical practice, the accuracy of diagnostic results is pivotal as it directly impacts disease treatment and patient outcomes. Molecular diagnostics, known for its rapid, precise, user-friendly, and high-throughput characteristics, has significantly advanced our capabilities in disease diagnosis[6]. Its crucial role extends across various domains such as infectious diseases, oncology, assessing medication safety and efficacy, and in tailoring individualized treatment strategies, thus becoming an indispensable element in clinical settings[7].

Historically, due to its abstract and complex nature, the teaching of molecular diagnostics has often been centered primarily on knowledge transmission, overlooking the comprehensive development of quality education[8]. The introduction of curriculum-based ideological and political education represents a transformative direction in this discipline. This integration seeks to imbue students with a balanced acquisition of medical knowledge and the development of a correct life and value outlook, an international perspective, innovative and critical thinking abilities, a sense of responsibility, national pride, and self-identity. The outbreak of COVID-19 has notably brought molecular diagnostics



into the public eye, offering an opportunity to guide students in appreciating the significance of national and familial bonds and the vastness of compassion.

This approach, akin to embedding hidden genes into teaching, integrates moral education seamlessly, ensuring that each student emerges as knowledgeable, inquisitive, reflective, discerning, and committed. The key challenge lies in the "traceless" incorporation of ideological and political content, aligning with the central educational ethos of fostering character and civic virtue. This necessitates a comprehensive educational framework that is inclusive, involving all staff and encompassing the entire educational process.

The syllabus and lesson plans for "Clinical Molecular Biology Laboratory Techniques" have undergone iterative revisions since 2016, emphasizing concept-driven teaching and factual accuracy. These revisions have led to the creation of various scenarios, paths, and methods that stimulate thoughtful and ethical learning. This pedagogical approach not only fosters professional ideals and competencies but also embeds socialist core values and patriotism within the fabric of the course. The teaching team's commitment to extracting key ideological and political points, aligned with current societal issues, has resulted in a robust ideological and political logic. This approach exemplifies the notion that each lesson incorporates ideological and political elements and every teacher is an educator in this realm, instilling the concept that every sample represents a living being.

For instance, in the chapter on "Tumor Molecular Diagnosis and Clinical Application," ideological and political education is woven through aspects such as cancer prevention and treatment, understanding the impact of molecular diagnostic technology on early intervention in diseases, and confronting challenges in the field. This integrative method not only imparts technical knowledge but also cultivates a sense of professional responsibility and a patient-centered medical philosophy in students.

The success and recognition of the course as a model of ideological and political integration reflect the efficacy of this approach. However, continuous improvement and innovation remain imperative to adapt to evolving educational needs and societal contexts.

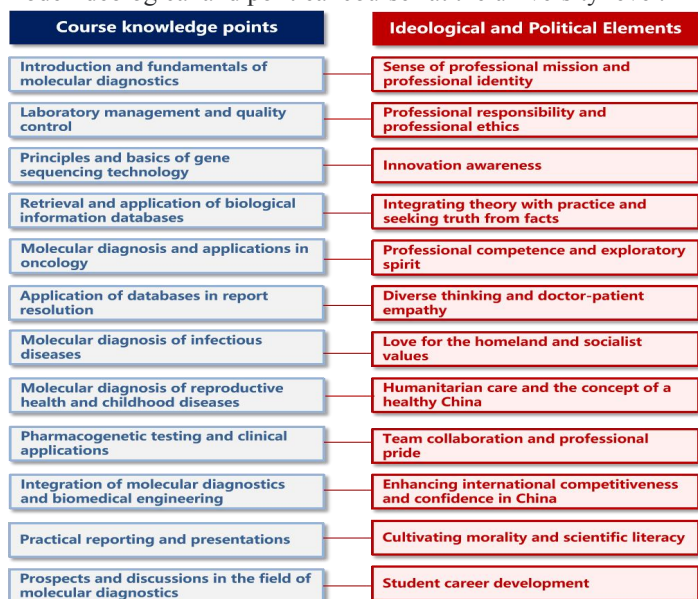
2 Logical Design of Course-based Ideological and Political Education

The process of seamlessly incorporating ideological and political education into the "Clinical Molecular Biology Laboratory Techniques" course requires a sophisticated and thoughtful approach. This integration, which we term as "traceless", aims to respect the individuality and diversity of students' thoughts, blending ideological content without it appearing forced or artificial.

2.1 Ideological and Political Entry Point: "Tracelessness"

The core challenge lies in achieving a traceless integration of ideological and political education. This begins with a fundamental question: "What kind of people do we aspire our students to become?" Drawing from the "Guidelines for the Construction of Ideological and Political Courses in Higher Education Institutions," our approach focuses on fostering character and civic virtue. It necessitates a cohesive effort from universities, teachers, and courses to unify explicit and implicit education, creating a synergistic effect that encompasses all staff, spans the entire educational process, and touches on all aspects of student development[9].

Teaching syllabi and lesson plans are pivotal in advancing this form of education. Since 2016, the syllabus for "Clinical Molecular Biology Laboratory Techniques" has been frequently revised to align with this ideology. The teaching team has engaged in multiple seminars to extract key ideological and political points, integrating current events and hot topics into the curriculum(Figure 1). This approach ensures that every lesson is imbued with ideological and political elements, reinforcing the notion that "behind every sample is a living life". As a result, the course has been acknowledged as a "model ideological and political course" at the university level.



For instance, in the chapter on 'Tumor Molecular Diagnosis and Clinical Application', ideological and political education is incorporated in several ways. It begins with the importance of cancer prevention through screening and early diagnosis and extends to discussing the 'Angelina Jolie Effect' in genetic testing. This not only demonstrates the impact of molecular diagnostics on disease intervention but also cultivates a patient-centered medical philosophy among students. Additionally, the challenges in molecular diagnostics for solid tumors and the advent of liquid biopsy technology are discussed, showcasing the evolving nature of the field and inspiring students to appreciate the innovative potential of molecular diagnostics.

Figure 1: Key Points Extraction of Ideological and Political Elements in the 'Clinical Molecular Biology Techniques' Course.

2.2 Holistic Layout for Value Leadership

The course structure revolves around a central focus, two levels, and three modules, forming a comprehensive framework for ideological and political education. This method integrates theoretical and practical teaching, weaving in ideological elements into basic abilities, clinical communication, and cutting-edge knowledge. Personal experiences of lecturers are used to deepen theoretical understanding and illustrate the political aspects of the field. Relevant events and clinical cases are employed to make the course relatable, enhancing professional pride and demonstrating the ubiquity of molecular diagnostics. The emphasis is always on the students, fostering scientific temperament, pragmatic attitudes, and a rigorous work style.

In summary, the logical design of course-based ideological and political education in "Clinical Molecular Biology Laboratory Techniques" is a deliberate and thoughtful process. It aims to embed moral and ethical considerations within the technical curriculum, preparing students not just as skilled professionals, but as responsible and ethical individuals.

3 Innovation and Integration

3.1 The "New" in New Medical Sciences and Returning to the "Essence" of Clinical Practice

The Ministry of Education's push for the "Six Excellences and One Top-notch" plan underscores the urgency to evolve the talent cultivation system for new medical sciences to meet the demands of the new era[10]. Molecular diagnostic technology, a burgeoning field at the intersection of medicine and engineering, has revolutionized early disease diagnosis and prognosis, propelling modern laboratory medicine forward[11]. Integrating the 'new' aspects of this technology with the 'essence' of clinical basics in course content remains a central pedagogical challenge.

Innovative education, as a new mandate in higher education, requires blending contemporary scientific advancements with foundational clinical practices[12]. Our course, "Molecular Diagnosis and the Integration with Medical Engineering," exemplifies this. Lecturers elucidate real-world applications such as biosensors, microfluidic chips, and droplet digital PCR. These discussions not only ignite students' intellectual curiosity but also instill a sense of national pride and the spirit of innovation. This module effectively binds life sciences, engineering, and natural sciences, encouraging students to embrace and contribute to this transformative era.

Conversely, the chapter "Pharmacogenomics and Clinical Applications" focuses on the 'essence' of clinical practice. It emphasizes understanding patient history, respecting privacy in genetic testing, and the importance of effective communication with clinicians. By presenting molecular diagnostic cases in clinical settings, such as personalized treatment plans and medication guidance, the course aims to instill a patient-centered ethos, underscoring the responsibility and integrity essential in medical practice.

3.2 Teachers as the Best Ideological and Political Elements

The 20th National Congress of the Communist Party of China's emphasis on teacher team building aligns with our focus on teachers as central to imparting ideological and political values. Teachers, through their conduct, cultural heritage, and humanistic literacy, play a pivotal role in shaping students' moral and ethical perspectives[11].

Recognizing this, we have assembled a diverse teaching team, including leading molecular field scholars and experienced clinical case communicators. This team not only brings cutting-edge professional knowledge to the classroom but also enriches the ideological and political content of the course.

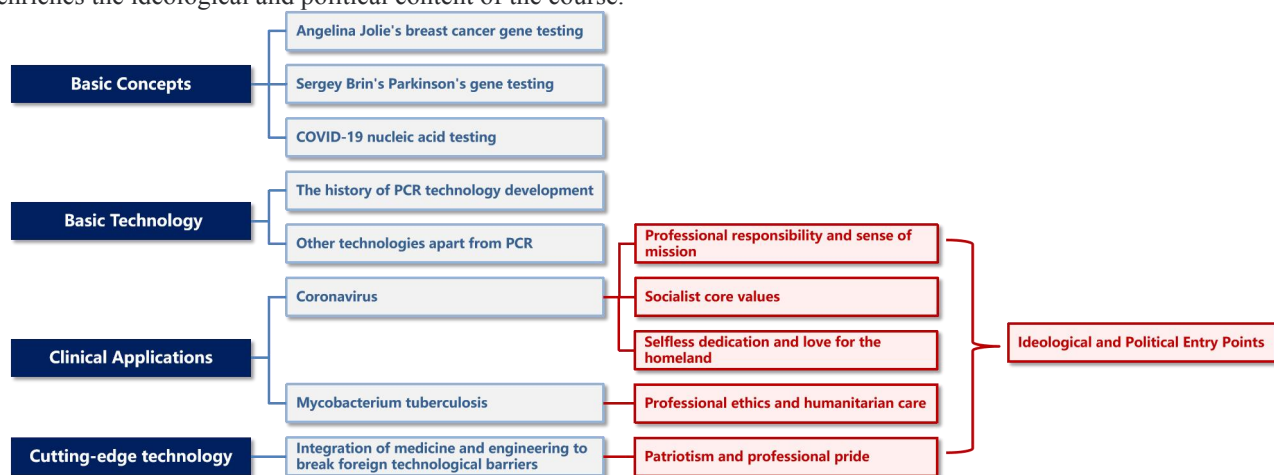


Figure 2 Ideological and Political Design Logic Diagram of the 'Introduction and Basics of Molecular Diagnosis' Course. The global impact of COVID-19 and the subsequent prominence of nucleic acid testing provide a unique opportunity for patriotic education[13]. The course begins with "Introduction and Basics of Molecular Diagnosis," where lecturers share frontline experiences in combating COVID-19, such as developing testing kits and assisting in epidemic prevention(Figure 2). These narratives demonstrate the discipline's societal contributions, instilling a sense of national duty in students.

In summary, this section underscores the integration of innovative approaches in medical sciences with a deep-rooted focus on clinical essentials, while highlighting the indispensable role of teachers in weaving ideological and political education into the fabric of molecular diagnostics teaching..

4 Conclusion

As Mr. Tao Xingzhi, a renowned Chinese educator, once articulated, "We deeply believe that education is the fundamental long-term plan of the nation." The true essence and effectiveness of education can only be realized through continuous innovation and practice. This proverbial saying, "One cannot know the height of the heavens without ascending the mountains, nor the depth of the earth without approaching deep streams," aptly describes our journey in integrating ideological and political elements into the 'Clinical Molecular Biology Laboratory Techniques' course. This endeavor, while challenging, has been met with initial success and accolades, particularly from our students who often regard their instructors as 'ideal mentors.'

Our teaching team is acutely aware of the long journey ahead. Despite the commendations and recognitions we have received, including the distinction of the course as a 'model ideological and political course' and accolades for 'excellent demonstration courseware and lesson plan,' we recognize the need for continual improvement and adaptation. In this pursuit, we are steadfast in our commitment to adhere to the guiding principles set forth by the Party, responding to the call of the nation, and striving to cultivate top-notch talents who are not only skilled but also morally and ethically sound. The future is indeed promising, and we are resolute in our endeavor to live up to the expectations and demands of this new era. Our mission is to mold students who are not only academically proficient but also socially responsible, imbued with a sense of national pride, and equipped with a global perspective. In doing so, we aim to contribute to the broader goals of societal advancement and national development. As we continue on this path, our focus remains on nurturing talents who will be at the forefront of medical and scientific innovation, all the while being anchored by a strong moral compass and an unwavering commitment to the betterment of society.

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