

# Exploration on Teaching Reform and Talent Cultivation in Environmental Health from the Perspective of “Double First-Class” Construction

Xi Wang, Chaowei Wang, Yang Liu, Lian Liu, Lulu Bai, Liangyu Cui, Qi Jing, Yuyang Ma, Yujie Ning\*

Department of Occupational and Environmental Health, School of Public Health, Xi'an Jiaotong University Health Science Center, Xi'an 710061, Shaanxi, China

*\*Author to whom correspondence should be addressed.*

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**Abstract:** The “Double First-Class” construction focuses on the development of disciplinary connotations and the improvement of talent cultivation quality, posing higher demands on the teaching mode and talent supply of public health and preventive medicine disciplines. Environmental health, as a core course in public health and preventive medicine, directly relates to the cultivation of effective composite public health talents. Based on the core orientation of the “Double First-Class” construction and combining the talent cultivation and course characteristics of environmental health, this paper explores the significance of teaching reform and talent cultivation in environmental health from the perspective of “Double First-Class” construction. It also investigates the paths for teaching reform and talent cultivation from multiple dimensions, aiming to provide references for cultivating high-quality professionals who meet the needs of national public health development and ecological environmental protection.

**Keywords:** “Double First-Class” construction; Environmental health; Teaching reform; Talent cultivation; Practical teaching innovation

**Online publication:** December 4, 2025

## 1. Introduction

The “Double First-Class” construction represents a core strategy for China’s higher education to transition from scale expansion to quality enhancement. Its essence lies in leading with course construction, strengthening the core position of talent cultivation, and nurturing high-quality specialized talents with patriotism, innovative spirit, and practical abilities. Environmental health, as an interdisciplinary field connecting public health, ecology, environmental science, and other disciplines, not only serves as an important pillar for the first-level discipline of public health and preventive medicine but also plays an irreplaceable role in safeguarding population health, promoting ecological environmental governance, and addressing complex environmental health risks. Against this backdrop, exploring the teaching reform and talent cultivation pathways for

environmental health within the context of the “Double First-Class” initiative holds profound significance for enhancing the quality of public health talent cultivation, advancing disciplinary development, and serving critical national strategic needs.

## **2. Core orientation of the “Double First-Class” initiative**

The crux of the “Double First-Class” initiative lies in steering higher education from a focus on scale expansion to a pursuit of qualitative improvement, with disciplinary development as its cornerstone. It emphasizes the dual objectives of enhancing quality and fostering distinctive characteristics. Its core orientation does not seek comprehensive coverage across all academic disciplines but rather leverages advantageous disciplines as catalysts to refine core disciplinary directions, solidify the foundation for substantive development, and construct a disciplinary ecosystem that is highly aligned with national strategic needs and industry trends.

Talent cultivation stands as the central mission of the “Double First-Class” initiative, with a key emphasis on breaking free from the constraints of traditional knowledge-imparting models. It prioritizes the collaborative cultivation of innovative spirit, practical capabilities, and a sense of national responsibility, aiming to nurture high-caliber professionals equipped with interdisciplinary perspectives and the ability to solve complex problems. Concurrently, the initiative adheres to an innovation-driven philosophy for disciplinary development, promoting deep integration between research and teaching. It facilitates the transformation of cutting-edge research findings into high-quality teaching resources, thereby fostering a virtuous cycle among disciplinary development, talent cultivation, and social service. Furthermore, openness and collaboration represent significant value orientations of the “Double First-Class” initiative, advocating for the dismantling of disciplinary barriers, institutional divisions, and industry-academia silos. By integrating premium educational and teaching resources, it establishes a diverse and collaborative platform system for both talent cultivation and research, ultimately elevating the overall competitiveness of higher education and providing robust talent and intellectual support for high-quality development in key national sectors.

## **3. Talent cultivation and curricular characteristics in environmental health**

The talent cultivation in environmental health centers on cultivating composite competencies and applied skills, closely aligning with the dual demands of public health advancement and ecological environment governance. This approach fosters a distinctive blend of interdisciplinary perspectives and social service attributes in talent development. Its cultivation logic breaks down the barriers of knowledge in a single discipline, emphasizing the integration of capabilities across multiple fields such as foundational public health theories, various environmental monitoring technologies, and risk assessment methods. It constructs a trinity system of “knowledge accumulation–skill refinement–literacy cultivation.” During the cultivation process, it not only stresses a precise grasp of core theories but also focuses on shaping interdisciplinary thinking, guiding learners to integrate perspectives from disciplines such as environmental science, ecology, and epidemiology to address complex environmental health challenges. At the same time, it consistently adheres to a social service orientation, cultivating a sense of responsibility and practical application abilities to achieve precise alignment between professional value and societal needs.

The course itself is characterized by its interdisciplinary and dynamic nature, integrating theoretical frameworks and research methodologies from multiple disciplines such as public health, environmental science, and basic medicine to form a systematic and comprehensive knowledge system. Course content is

continuously optimized in response to the evolution of human survival and ecological environment issues and the upgrading of public health demands, constantly incorporating cutting-edge research findings to maintain the contemporaneity of the knowledge system <sup>[1]</sup>. This ensures both depth in theoretical understanding and enhanced practical abilities to address real-world problems, aligning synergistically with the objectives of talent cultivation.

## **4. The significance of teaching reform and talent cultivation in environmental health from the perspective of “Double First-Class” construction**

### **4.1. Strengthening disciplinary content construction and aligning with the development orientation of “Double First-Class”**

The core pursuit of “Double First-Class” construction is the connotative development and distinctive breakthrough of disciplines. As a core supporting discipline within public health and preventive medicine, the teaching reform and talent cultivation quality of environmental health directly relate to the enhancement of the discipline’s overall competitiveness. Through teaching reform, core disciplinary directions can be further refined, the curriculum system and teaching content optimized, and interdisciplinary resource integration strengthened, making disciplinary construction more aligned with national strategic demands and industry development trends. Meanwhile, reform can promote deep integration of teaching and research, transforming cutting-edge research findings into high-quality teaching resources, and improving the disciplinary talent cultivation chain. This, in turn, strengthens the academic foundation and development potential of the discipline, assisting it in forming differentiated advantages in “Double First-Class” construction and achieving a transition from scale development to quality improvement.

### **4.2. Improving the quality of talent cultivation to meet the demand for interdisciplinary talents**

The core objective of talent cultivation in the “Double First-Class” initiative is to nurture high-caliber specialized professionals equipped with an innovative spirit, practical abilities, and an interdisciplinary perspective, which deeply aligns with the talent cultivation goals in environmental health science. Through educational reform, the talent cultivation model is reshaped to break free from the constraints of traditional knowledge-imparting approaches, deepening the integration of theory and practice, and focusing on enhancing students’ core professional competencies, such as environmental health risk assessment and resolving complex issues related to diseases caused by environmental pollution. Meanwhile, the reform emphasizes the coordinated development of patriotism and professional competence, guiding students to establish a conscious sense of responsibility to serve public health and ecological environmental protection <sup>[2]</sup>. This helps them grow into interdisciplinary talents who possess theoretical depth, proficiency in environmental health detection technologies, and social responsibility, effectively filling the current gap in high-quality environmental health professionals in the field of public health and precisely meeting the core expectations of the “Double First-Class” initiative regarding the quality of talent supply.

### **4.3. Strengthening social service capabilities to respond to national strategic development needs**

The disciplinary nature of environmental health science determines its close connection with national strategies such as public health security, ecological environmental governance, and “Healthy China.” The educational

reform within the context of the “Double First-Class” initiative further highlights the discipline’s value in serving the nation and society. Through reform, talent cultivation can be precisely aligned with the country’s actual needs, enhancing students’ practical and handling capabilities in addressing emerging environmental health risks and participating in ecological environmental governance and restoration, ensuring that talent output can better respond to the real needs of ecological civilization construction and the improvement of the public health emergency response system <sup>[3]</sup>. Additionally, the reform facilitates the transformation of disciplinary resources into social services, helping to solve complex environmental health issues through talent support and technological empowerment, strengthening the intellectual support that higher education provides for the development of key national sectors, and demonstrating the core mission of the “Double First-Class” initiative to serve national strategies and empower social development.

## **5. Paths for educational reform and talent cultivation in environmental health science within the context of the “Double First-Class” initiative**

### **5.1. Reconstructing the curriculum system to strengthen the integration of interdisciplinary and cutting-edge elements**

The requirements for disciplinary connotations in the construction of “Double First-Class” universities determine that the curriculum system for environmental health must break free from the traditional framework of a single discipline and undergo reconstruction centered around “a solid foundation, a focus on cutting-edge topics, and interdisciplinary integration.” Firstly, it is necessary to optimize the structure of course modules by dividing them into three major categories: foundational theories, core technologies, and cutting-edge interdisciplinary topics. While consolidating the fundamental principles of environment and health, emphasis should be placed on enhancing the teaching weight of core technical content such as environmental health risk assessment, environmental pollutant monitoring and control, and ecological environment governance <sup>[4]</sup>. Secondly, efforts should be made to promote the integration of interdisciplinary resources by actively aligning with high-quality teaching resources from related disciplines such as environmental science, ecology, big data science, and epidemiology. Interdisciplinary elective courses or special lectures should be introduced to break down disciplinary boundaries and cultivate students’ comprehensive thinking abilities. Simultaneously, a dynamic content updating mechanism should be established to closely track emerging issues and demands that arise during the process of ecological civilization construction and the improvement of the public health emergency response system <sup>[5]</sup>. Cutting-edge achievements, such as the hazards of novel environmental pollutants, big data analysis in environmental health, and global environmental health governance, should be promptly incorporated into teaching content to ensure that the curriculum system aligns with national strategic needs and industry development trends. This approach ensures that talent cultivation is both rooted in disciplinary foundations and equipped with a forward-looking perspective, in line with the core orientation of “Double First-Class” construction towards distinctive and connotative disciplinary development.

### **5.2. Innovating teaching methods and establishing a “theory-practice-innovation” linkage mechanism**

Innovation in teaching methods is crucial for enhancing the quality of talent cultivation. It is necessary to closely adhere to the requirements of “Double First-Class” construction for fostering innovative spirit and practical abilities, break away from the traditional model dominated by classroom lectures, and establish a diversified and interactive teaching system. On the one hand, inquiry-based, case-based, and project-based teaching



methods should be promoted. By setting up real-world environmental health problem scenarios, students should be guided to actively participate in problem analysis, solution design, and demonstration. This approach deepens their understanding of theoretical knowledge through interactive discussions and exercises their logical thinking and problem-solving abilities for complex issues. On the other hand, it is essential to enhance the systematic nature and effectiveness of practical teaching, promote in-depth integration between classroom instruction and laboratory operations as well as frontline job practices, and expand the collaborative dimensions of practical teaching on this basis. This involves strengthening cooperation with the Centers for Disease Control and Prevention, environmental protection enterprises, and research institutes to build a practical education community featuring school-enterprise collaboration and school-local interaction. Such an approach provides students with immersive practical scenarios, allowing them to hone their professional skills in real-world work environments. Additionally, leveraging information technology to empower teaching reform involves utilizing online teaching platforms to establish channels for resource sharing and introducing digital teaching methods such as virtual simulation experiments and online simulation training. By simulating on-site practical teaching through virtual laboratories and embedding case studies, students are guided to engage more deeply in learning, fostering their ability to autonomously explore, analyze, and solve problems <sup>[6]</sup>, thereby compensating for the limitations of traditional practical teaching and achieving an organic integration of theoretical learning, practical training, and innovative exploration, comprehensively enhancing the relevance and effectiveness of talent cultivation <sup>[7]</sup>.

### **5.3. Strengthening the faculty team and optimizing the evaluation system to solidify the foundation for reform**

The faculty team and evaluation system serve as the core safeguards for the effective implementation of teaching reforms. It is necessary to align with the requirements of the “Double First-Class” initiative for high-caliber faculty and scientific evaluation mechanisms, break through traditional teaching models, and enhance teachers’ educational and teaching capabilities <sup>[8]</sup>. In terms of faculty development, on the one hand, it is crucial to strengthen the cultivation of teachers’ interdisciplinary literacy by encouraging them to participate in interdisciplinary research projects, academic exchanges, and short-term training programs to broaden their knowledge horizons and enhance their interdisciplinary teaching and research capabilities. On the other hand, it is essential to promote the optimization of the faculty structure by introducing industry experts and frontline technical professionals with both theoretical foundations and practical experience to participate in teaching <sup>[9]</sup>, thereby constructing a dual-instructor teaching team comprising “in-school teachers + industry mentors” to achieve precise alignment between teaching and industry realities <sup>[10]</sup>. Simultaneously, establishing an incentive mechanism that integrates teaching and research for teachers encourages them to transform research achievements into teaching resources, promoting teaching through research and enhancing the depth and innovation of teaching. In terms of evaluation system optimization, it is necessary to break away from the single evaluation model centered on exam scores and construct a diversified evaluation system that incorporates theoretical mastery, practical operations, project design, innovative achievements, and social responsibility awareness into the evaluation dimensions. At the same time, process-based evaluation should be strengthened, comprehensively tracking students’ learning process and ability development through various forms such as classroom performance, practical reports, group discussions, and phased assessments. The teaching evaluation criteria should be refined from multiple aspects, focusing not only on students’ mastery of basic knowledge but also on their performance in practical applications and the development of innovative thinking. This way, a

scientific evaluation system can objectively reflect the quality of talent cultivation and guide students to focus on improving their comprehensive abilities and qualities, providing institutional guarantees for the continuous advancement of teaching reforms in environmental health from the perspective of “Double First-Class” initiatives.

## 6. Conclusion

In summary, the “Double First-Class” initiative has pointed out the core direction for quality improvement in the development of higher education disciplines and talent cultivation, while also providing an important opportunity for teaching reforms in environmental health. Through multi-dimensional reform paths such as curriculum system reconstruction, teaching method innovation, faculty development, and evaluation system optimization, environmental health can be transformed from a knowledge-infusion-oriented approach to a competence and quality cultivation-oriented one, continuously enhancing the precision and practicality of talent cultivation. In the future, as the “Double First-Class” initiative continues to deepen, teaching reforms in environmental health need to further align closely with national strategic needs and industry development trends, strengthening the deep integration and alignment of teaching with research, professional practice, and national needs, thereby providing solid talent support and professional guarantees for the development of the national public health sector, ecological civilization construction, and the realization of “Healthy China.”

## Disclosure statement

The authors declare no conflict of interest.

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