International Education Forum, 2026, Volume 4, Issue 8
http://ojs.bbwpublisher.com/index.php/IEF
Online ISSN: 2981-8605
Print ISSN: 3083-4902

Research on the Construction and Application of a Public Health Experimental Practice Teaching System Based on the Integration of Practice—Innovation—Internationalization

Yujie Ning[1], Chaowei Wang[1], Hui Wang[1], Yirong Qin[1], Pengyan Jiao[1], Zhouyun Chen[1], Yang Liu[2], Lian Liu[2], Lulu Bai[2], Liangyu Cui[2], Qi Jing[2], Yuyang Ma[2], Xi Wang[2]*

[1]Institute of Endemic Diseases, School of Public Health, Xi'an Jiaotong University Health Science Center, Xi'an 710061, Shaanxi, China
[2]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.

Abstract: In order to address the problems of the disconnect between theory and practice, insufficient cultivation of innovation ability, and weak integration of international teaching resources in current public health experimental practice teaching, this study is based on the disciplinary characteristics of public health and preventive medicine, combined with the actual teaching of undergraduate and international students, and based on policies such as the "Guiding Opinions of the General Office of the State Council on Further Supporting College Students' Innovation and Entrepreneurship," to construct a "practice—innovation—internationalization" integrated public health experimental practice teaching system. The research results indicate that this system can effectively promote the reform of practical teaching, strengthen students' innovation and entrepreneurship abilities, and enhance the level of international teaching, thereby providing theoretical reference and practical guidance for the reform of public health experimental practical teaching in similar universities.

Keywords: Practical innovation; Internationalization; Public health experimental practice teaching system

Online publication: August 31, 2026

1. Introduction

The continuous promotion of the Healthy China strategy has led to an increasing demand for comprehensive talents in the public health industry. While emphasizing comprehensive literacy, it also requires talents to possess solid theoretical and effective practical abilities as well as innovative thinking. Based on this, they

should be able to broaden their horizons internationally and combine with international development forms to achieve the implementation of the strategy [1]. Public health and preventive medicine, as an applied discipline closely linked to social needs, have experimental and practical teaching as the core link of talent cultivation, and their quality directly determines the effectiveness of talent cultivation [2]; Furthermore, the "Guiding Opinions of the General Office of the State Council on Further Supporting College Students' Innovation and Entrepreneurship" clearly proposes to promote the deep integration of innovation and entrepreneurship education with professional education, and strengthen practical teaching links; The construction of the new medical system also emphasizes the need to reconstruct the medical education system and enhance the practicality and internationalization level of talent cultivation [3]. In this context, this article aims to construct a deeply integrated teaching system of "practice—innovation—internationalization," in order to solve the problems in public health experimental practice teaching and further promote the improvement of the quality of public health talent cultivation.

2. Construction of an integrated teaching system that combines practice, innovation, and internationalization

2.1. Principles of system construction

Firstly, adhering to the principle of practice orientation, based on the actual needs of public health positions, practical teaching modules that are suitable for real work scenarios are designed by integrating experimental links from multiple courses such as public health, epidemiology, and health inspection technology, such as public health emergency response, infectious disease prevention and control, occupational environment risk assessment, etc., in order to strengthen the practical application of teaching theoretical knowledge and achieve the effect of enhancing students' job competence [4]. Secondly, following the principle of innovation-driven, relying on cutting-edge scientific research achievements in the current discipline, the course content of epidemiology methods of environmental gene interactions for graduate students will be extended to undergraduate teaching courses, thereby designing micro research topics and gradually guiding students to conduct research-based experiments based on real data. At the same time, a mechanism for connecting college students' innovation and entrepreneurship projects can be established to increase students' research guidance content and learning support resources, providing them with innovative inspiration and foundation [5]. Finally, implementing the principle of international collaboration, in accordance with the current needs of international student teaching and bilingual teaching, referring to advanced international teaching concepts and standards, developing bilingual practice resources and cross-cultural cases, and cultivating students' international perspectives and cross-cultural collaboration abilities; Such as building an international collaborative platform, conducting joint practice between Chinese and foreign students, international academic exchanges, and other activities.

2.2. Four in one teaching system framework

Based on the core of "practice—innovation—internationalization," a four in one teaching system is constructed, which includes course experiments, scientific research training, social practice, and international collaboration [6–8]. Each module is interrelated and mutually supportive, thus forming a closed-loop talent cultivation model.

(1) Course experiment: By integrating existing experimental projects on campus, a three-level curriculum

system consisting of basic experiments, comprehensive experiments, and design experiments is constructed; The basic experiments focus on training core skills such as sample detection and data statistics; Comprehensive experiments integrate multidisciplinary knowledge, such as the "Public Health Emergency Simulation" experiment, which covers the entire process of case investigation, risk assessment, and prevention and control plan formulation; Designing experiments involves students independently selecting topics, designing plans, and conducting innovative experimental research; And develop standardized experimental teaching manuals, establish a shared experimental platform, and provide basic guarantees for teaching quality.

(2) Scientific research training: Combining learning at different educational stages and degree levels, conducting hierarchical scientific research training, with undergraduate academic programs focusing on teaching scientific research methods, using micro courses, and training under the guidance of teachers; Graduate education focuses on project-based teaching, allowing students to participate in the execution process of specific research projects; International students and exchange students with international characteristics adopt group teaching, focusing on cross-cultural themes and conducting research on public social issues.

(3) Social practice: Before starting the practice, establish contact with local disease control centers, hospitals, community health service centers, and other organizations, and establish scientific research cooperation relationships in advance; Afterwards, students will be organized to carry out social practice activities in conjunction with scientific research projects, such as conducting surveys on residents' health conditions and providing guidance on infectious disease prevention and control; At the same time, establish standardized practice management mechanisms to constrain and ensure the effectiveness of students' practical activities.

(4) International Collaboration: Developing a bilingual practical research resource library in Chinese and English, integrating typical cases of infectious disease prevention and control in different countries, and providing international data support for students' learning, in accordance with international academic research requirements; At the same time, educators cooperate with foreign universities and international health organizations to carry out bilingual curriculum teaching activities, providing opportunities for cultural exchange and academic exploration for students from different countries both domestically and internationally.

In addition, by establishing a comprehensive evaluation system with a dual orientation of "process+ability" and using a multi-agent mutual evaluation method, all participating subjects are required to conduct comprehensive evaluations of themselves and other subjects, and use them as the basis for evaluating students' integrated teaching-learning effectiveness and comprehensive literacy.

3. Practical application of two teaching systems

3.1. Practical application scenarios and objects

Select one university's School of Public Health as the practice base, which involves 50 undergraduate students and 100 graduate students majoring in Public Health and Preventive Medicine, as well as 50 international students from four countries. The practical period is set for 2026-2028, mainly including four core courses: epidemiology, environmental health, public health, etc.

3.2. Typical practice case analysis

3.2.1. Case 1: Interdisciplinary practice of public health emergency simulation

Taking the outbreak of a new infectious disease as an example, organize students to complete the entire process of case reporting, on-site investigation, data analysis, risk assessment, and prevention and control plan formulation in a team form; Then invite emergency experts from local disease control centers to provide on-site guidance, and use virtual simulation technology to digitally restore the emergency response scene. The practical results show that more than 90% of students believe that their ability to handle complex public health issues has improved. At the same time, the average score of the comprehensive experimental assessment has increased by 12% compared to previous practical activities, fully demonstrating the high practical teaching effectiveness of the comprehensive practical module.

3.2.2. Case 2: Microscience research project on the interaction between environment and genes and the prevention and control of chronic diseases

Based on the research direction of the disciplinary research team, design corresponding research projects that undergraduate students can participate in, and then guide students to carry out data analysis and mechanism exploration activities for the project by collecting information such as air quality data, resident chronic disease incidence data, and genetic testing data of a certain city. In this activity, it was found through the evaluation of students' research reports that more than 10 research reports reached a high level of quality. Not only was the data analysis more in-depth, but the scope also extended to environmental protection, urban construction, and public health security. Some project reports also have the qualifications to participate in provincial-level university student innovation and entrepreneurship projects, and even excellent reports were directly recognized and affirmed by core journals, greatly stimulating students' enthusiasm for participating in scientific research projects.

3.2.3. Case 3: Comparative study on cross-cultural public health literacy between Chinese and foreign students

By organizing a joint research project team consisting of Chinese and international students, community residents from countries such as China, Thailand, and Pakistan were selected as research subjects. Subsequently, a public health literacy questionnaire survey and comparative analysis were conducted. In the practical process of this project, due to the involvement of many countries and the theme of joint teaching, as well as the survey content of public health literacy, it received strong support from the International Society of Public Health. The research results have also been used as the latest public health data from multiple countries for exchange at international academic conferences. Through this project, the cross-cultural communication skills and international academic expression abilities of domestic students have been significantly enhanced, while also expanding the international influence of the discipline.

3.3. Teaching team building

In order to ensure the effective operation of the public health experimental practice teaching system based on the integration of "practice—innovation—internationalization," and to build an interdisciplinary, international, and industry-university research-combined teaching team. The construction of teaching teams is strictly carried out in accordance with four strategies. Firstly, regular training on innovative teaching methods and bilingual teaching skills is conducted to enhance teachers' comprehensive literacy; Secondly,

support teachers to participate in international academic exchanges and collaborative research, and expand their international perspectives; Thirdly, establish an integrated mechanism of teaching and research, encouraging teachers to transform research achievements into teaching content; The fourth is to hire industry experts as part-time teachers to strengthen the pertinence of practical teaching.

4. Evaluation of the effectiveness of the 3 teaching systems

4.1. Evaluation indicator system

The evaluation object is the practical application scenarios and objects mentioned in section 2.1 above, and the content scope includes the implementation process and output results of the four modules of course experiments, scientific research training, social practice, and international collaboration, as well as the implementation effect of the evaluation reform module. Therefore, the evaluation index system follows the principles of scientificity, comprehensiveness, and operability, and is constructed using the Delphi method; Furthermore, the weights of each indicator are determined through the Analytic Hierarchy Process, and the evaluation criteria refer to relevant national education quality standards and industry norms, as shown in **Table 1**.

Table 1. Evaluation indicator system

First level indicators (weights)	Second level indicators (weights)	Third level indicators (weights)
Student Competence Enhancement (0.45)	Practical Operational Ability (0.18)	Basic experiment pass rate, comprehensive experiment completion quality, emergency response simulation score, excellent rate of practical reports;
	Innovation Literacy (0.15)	Innovation project application approval rate, number of research papers published, number of patent applications, awards for innovative proposals
	International Perspective (0.12)	Bilingual course grades, international project participation, selfrated crosscultural communication score, international academic presentation ability
Teaching Operation Quality (0.30)	Resource Development (0.10)	Number of integrated courses, case bank update frequency, bilingual resource coverage rate, experimental platform sharing rate
	Process Implementation (0.12)	Experiment participation rate, research training duration, international collaboration frequency, student course satisfaction
	Team Capacity (0.08)	Bilingual teaching ability attainment rate, number of teachingresearch projects approved, number of international cooperation achievements, industry guidance ability score
Social and Industry Recognition (0.15)	Employer Evaluation (0.08)	Graduate job competency score, practical performance satisfaction, continuity of cooperation willingness
	Social Feedback (0.07)	Graduate employment competitiveness, industry reputation, evaluation by international partner institutions, feasibility of outcome promotion
Evaluation Reform Effectiveness (0.10)	System Adaptability (0.10)	Rationality of evaluation indicators, fairness of evaluation process, guiding value of evaluation results

In addition, the evaluation implementation is divided into three stages: pre-evaluation, formal evaluation, and data verification and calibration, in order to ensure the comprehensiveness and feasibility of the evaluation content, as well as the authenticity of the evaluation data.

4.2. Evaluation results and analysis

Present the evaluation results and analysis from the perspectives of students, teaching, and society, as shown in **Table 2**.

Table 2. Evaluation results

Evaluation Content	Main Evaluation Indicators	Before Reform	After Reform
Student Competence Enhancement	Practical operational ability (score)	72	88
	Number of innovation project applications (case)	2	7
	Project participation rate (%)	5	38
Social and Industry Recognition	Number of institutions willing to cooperate	3	8
	Promotion status	No promotion	Adopted by 2 institutions

According to **Table 2**, the public health experimental practice teaching system based on the integration of "practice—innovation—internationalization" has shown significant improvement in various core dimensions after implementation, indicating a positive cycle between students' comprehensive abilities and teaching operation quality. Furthermore, the significant increase in key indicators such as practical operation and innovation literacy indicates that the "practice—innovation—internationalization" integration model has high feasibility. The integration of resources and the improvement of teaching staff capabilities further provide talent and resource support for the implementation of the system, with high industry satisfaction and feasibility of promotion, intuitively demonstrating its practical value for the cultivation of public health talents, which can lay a solid foundation for subsequent optimization and promotion.

4.3. Problems and improvements

Based on feedback from multiple stakeholders and data, it can be concluded that there are four prominent issues in the practical application of the public health experimental teaching system based on the integration of "practice—innovation—internationalization," which require targeted improvement.

(1) There are limitations to resource integration and sharing: relying on the provincial public health teaching guidance committee, educators will build an online and offline resource-sharing platform, integrate high-quality courses, cases, equipment, and other resources, and provide an international resource-sharing platform for local universities and industry units.

(2) There are obstacles to collaboration between Chinese and foreign students: special courses such as bilingual communication in public health and international academic norms should be offered, cross-cultural and academic norms training should be strengthened, and a mutual aid group for Chinese and foreign students should be established, equipped with cross-cultural guidance teachers, to resolve potential collaboration barriers in advance and achieve the goal of improving collaboration efficiency [9].

(3) The evaluation of innovation capability is not sound enough: by refining the evaluation criteria for the basic, advanced, and excellent levels of innovation capability, increasing the weight of qualitative indicators, and introducing a third-party expert evaluation mechanism, students' innovation achievements can be objectively evaluated to ensure the objectivity and accuracy of the evaluation [10].

(4) The closed-loop application of evaluation results has not been formed: by constructing a closed-loop mechanism of evaluation → analysis → improvement → feedback, clarifying the main body and time nodes of improvement responsibility, and then incorporating the improvement results into the evaluation

indicators of the teaching team, periodic effect teaching and research can be achieved to ensure the improvement of teaching quality in practice and application of evaluation results.

5. Conclusion

In summary, based on the integration of "practice—innovation—internationalization" in the public health experimental practice teaching system, in the construction process, the common characteristics of curriculum experiments, scientific research training, social practice, and international collaboration should be comprehensively considered, so as to construct a "four in one" practical teaching framework system, effectively solve the problems of limited resource integration and sharing, obstacles to collaboration between Chinese and foreign students, inadequate evaluation of innovation ability, and the lack of a closed loop for the application of evaluation results in current public health experimental practice teaching, and further improve the education level of medical colleges and universities. In addition, although the sample size of this study is limited, the effectiveness evaluation is mainly based on short-term data, and the cooperation of the internationalization module is mainly concentrated in universities in developing countries. Therefore, in future research, researchers can strengthen the depth and comprehensiveness of research by tapping into the scope of practice, conducting long-term tracking research for more than 5 years, deepening international cooperation, and introducing digital technology, in order to promote research with stronger theoretical guidance value and practical reference significance.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Wang XL, Zhang X, Song L, et al., 2024, Construction and Practice of Experimental Teaching System Based on Ability and Literacy Development. Continuing Medical Education, 38(1): 37–40.

[2] Zou LJ, Gao YF, Hu GH, 2024, Construction of Evaluation Index System for Public Health Master's Degree Practice Base in Local Medical Colleges. Journal of Gannan Medical College, 44(7): 754–760.

[3] Liu QL, Li XY, Song AQ, et al., 2024, Reconstruction and Practical Exploration of Basic Medical Experimental Teaching System under the Background of New Medicine. China Health Industry, 21(6): 253–256.

[4] Yang Y, Chen R, Xu J, et al., 2025, Research on Public Health Practice Science Popularization Education and Effect Evaluation. Journal of Higher Education, 11(5): 89–92.

[5] Zheng WQ, Li SP, Zhao GY, et al., 2025, Exploration and Research on the Standardization Construction of Practical Teaching in Media Biology. Chinese Journal of Health Insecticidal Devices, 31(5): 617–623.

[6] Hu J, Zhuo WW, Li YJ, et al., 2024, Exploration and Practice of Cultivating Innovative Abilities of Pharmaceutical Vocational College Students under the Concept of "Integration of Science and Education" — Taking the Course of "Biochemistry" as an Example. Science and Technology Wind, 2024(21): 102–104.

[7] Fang XY, Fan YG, Ye DQ, 2024, Based on the Construction of Interdisciplinary Curriculum Teaching System, Improve the Quality of High-level Public Health Talent Training. Chinese Journal of Disease Control and Prevention, 28(12): 1365–1372.

[8] Liu Y, Zhou L, Zhang Z, et al., 2023, Reform and Practice of Practical Teaching System for College Food Chemistry Based on the Cultivation of Applied Talents. Chemical Management, 2023(18): 37–40.

[9] Yu DJ, Fan RH, Feng X, et al., 2024, Research on the Construction of Health Inspection and Quarantine Experimental Teaching System Based on Job Competence. China Modern Education Equipment, 2024(11): 162–165.

[10] Du BY, Guo Y, Yuan PP, et al., 2025, Exploration of Reconstructing the Immunology Curriculum System to Improve the Teaching Quality of Preventive Medicine Undergraduate Students. Chinese Journal of Immunology, 41(5): 1220–1222.