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Food Hygiene Teaching Reform in the Nutrition and Food Hygiene Course: Current Challenges and Innovative Strategies

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Abstract: Based on the demand for food safety personnel training outlined in the "Healthy China 2030" strategy, this study identifies several key issues in the Nutrition and Food Hygiene course within Preventive Medicine education. These include the use of a single teaching method, excessive course content relative to limited class hours, a shortage of dual-qualified instructors, insufficient practical training, and an underdeveloped evaluation system. To address these challenges, the study proposes a systematic reform approach. This includes introducing flipped classrooms and case-based teaching to enhance student engagement; integrating modular content and expanding online resources to optimize class time; strengthening university–enterprise cooperation to support the development of dual-qualified teaching staff; incorporating virtual simulation experiments and comprehensive practical projects to improve hands-on skills; and establishing a multi-dimensional evaluation system that encompasses theoretical knowledge, practical skills, and professional competencies. Together, these strategies aim to cultivate high-quality food hygiene professionals who are better aligned with the needs of society, providing both theoretical guidance and practical support for curriculum reform.

1. Introduction

In the context of the *Healthy China 2030 Programme*, the public health mindset is shifting from a focus on disease treatment to an emphasis on health promotion and disease prevention[1]. As a

crucial component of building a healthy China, food safety is directly linked to public health, social stability, and economic development[2]. However, in recent years, frequent food safety incidents have highlighted ongoing challenges. Notable examples include the 2024 case of "tanker trucks mixed with cooking oil" in Jinzhou City, Shijiazhuang, Hebei Province; recent reports of tripe soaked in formaldehyde to maintain freshness; and the recurring food hygiene issues exposed annually on the International Day for Protecting Consumers' Rights (March 15) [3]. These incidents serve as stark reminders of the severity of the current food safety situation, underscoring the urgent need to train high-quality food safety professionals capable of addressing emerging challenges.

Students majoring in preventive medicine are expected to play a vital role in the future of food safety, serving as a reserve force for food safety prevention, control, and management [4]. The teaching of food hygiene within the Nutrition and Food Hygiene course is a key component in fostering food safety literacy among these students. Through both theoretical instruction and practical training, students gain an understanding of the causes and health consequences of food contamination, acquire knowledge of food safety risk assessment and control strategies, and establish a solid theoretical and practical foundation for future roles in food safety monitoring, law enforcement, and health education[5]. However, the current teaching of food hygiene still faces several challenges, including reliance on a single instructional method, an imbalance between extensive course content and limited class time, a shortage of qualified instructors, a disconnect between theory and practice, and an incomplete evaluation system. As a result, the effectiveness of training remains suboptimal, falling short of the goal to cultivate high-quality applied public health professionals, particularly those equipped to respond to public health emergencies.

This study therefore aims to explore reforms in the teaching of food hygiene within the Nutrition and Food Hygiene course. By optimizing teaching methods, it seeks to provide both theoretical guidance and practical support for the development of high-calibre, practice-oriented food safety professionals in the field of preventive medicine.

2. Major problems in the teaching of food hygiene

2.1 Unitary teaching methodology

In the current teaching of food hygiene theory, traditional didactic instruction still dominates. This teacher-centered approach, characterized by systematic and hierarchical knowledge delivery, effectively highlights key and challenging teaching points, enables rapid transmission of large volumes of content, and benefits students with weaker academic foundations or limited independent learning abilities[6]. However, the primary drawback of this method lies in its one-way, indoctrinative nature. By overemphasizing the teacher's role and neglecting students' active participation, it reduces learners to passive recipients of knowledge and limits meaningful classroom interaction. Consequently, students may experience learning fatigue, inattentiveness, and

a lack of interest and motivation[7].

Moreover, didactic teaching tends to prioritize knowledge delivery over the development of students' practical skills and higher-order thinking. As a result, students have limited opportunities to cultivate their abilities to identify, analyze, and solve problems during class, making it even more challenging to foster innovation and a spirit of inquiry.

2.2 More teaching content and fewer classroom hours

In the current teaching of food hygiene within the Nutrition and Food Hygiene course, a common challenge is the imbalance between the extensive teaching content and limited class time[8]. The curriculum encompasses several core areas, including food contamination and its prevention, the use and regulation of food additives, various categories of food hygiene and their management, foodborne diseases and their prevention, food safety risk analysis and control, as well as food safety supervision and regulation. Each of these topics involves a wide range of knowledge points and is characterized by complexity and systematicity. Meanwhile, with the rapid advancement of the field, new types of food and emerging technologies continue to appear, leading to novel food safety concerns that are becoming focal points in teaching[9].

However, constrained teaching hours make it difficult for instructors to delve deeply into core content while simultaneously integrating cutting-edge developments and skills training. As a result, achieving a balance between content breadth and depth remains a significant challenge. This "more content, less class time" contradiction not only compromises teaching quality, but also hinders students from developing a coherent and systematic knowledge framework. Consequently, their learning often remains at a fragmented theoretical level, while opportunities to cultivate practical application skills are significantly diminished.

2.3 Lack of teachers, especially dual-teachers

In the context of "great health" initiative in China, the Chinese society has placed higher demands on the comprehensive competencies of preventive medicine students, while also raising expectations for the qualifications of faculty responsible for related teaching tasks. This situation has further exposed the pressing issue of a shortage of dual-qualified instructors in the field of food hygiene and safety education[10]. Dual-qualified teachers are those who possess both a solid foundation in theoretical knowledge and extensive practical experience [11].

However, nutrition and food hygiene courses in many universities are currently taught primarily by academic faculty who, although strong in scientific research, often lack hands-on experience in industry settings. As a result, their understanding of real-world challenges—such as the implementation of food safety interventions—is often limited, making it difficult to effectively integrate theoretical teaching with practical application. Moreover, the lack of robust school–enterprise collaboration, along with insufficient platforms for professional skills training and

industry-based practice, further constrains faculty members' opportunities to enhance their practical capabilities.

2.4 Inadequate cultivation of practical ability

In the teaching of food hygiene, there is a notable deficiency in the cultivation of students' practical abilities[12]. Current laboratory courses tend to emphasize technical procedures and theoretical verification—such as food sample collection and preparation, or coliform testing of tableware. While these exercises contribute to the development of basic technical skills, they often lack comprehensive, innovative, and practice-oriented projects that closely mirror real-world conditions. This teaching model results in a disconnect between what students learn and how that knowledge is applied in practice, leaving them ill-equipped to address complex food hygiene issues in real-life situations.

Furthermore, due to limited experimental resources and insufficient collaboration with industry, students have minimal exposure to the actual demands and work environments of the food safety sector. As a consequence, it is difficult for them to develop key practical competencies such as emergency response, teamwork, and problem-solving.

2.5 Incomplete teaching evaluation system

The lack of a comprehensive evaluation system is a key issue limiting the quality of food hygiene education[13]. Currently, teaching evaluation primarily relies on final examination results, with a single assessment model that fails to adequately capture students' learning processes, practical skills, and innovative capacities. This narrow approach cannot truly reflect students' overall competence—particularly in practical sessions, where experimental operation, teamwork, and problem-solving abilities are difficult to assess through traditional exams. Moreover, existing evaluation standards tend to emphasize theoretical knowledge while overlooking students' performance in the practical application of food hygiene and safety principles.

Therefore, there is a need to establish a more scientific and diversified evaluation system that integrates both formative (process-based) and summative (outcome-based) assessments. Such a system would enable a more holistic evaluation of students' knowledge acquisition, practical competence, and creative thinking, ensuring that assessment outcomes more accurately reflect their learning achievements.

3. Discussion on the path of food hygiene teaching reforms

3.1 Reform teaching methods to enhance student participation

To enhance students' classroom engagement, food hygiene education should prioritize the

diversified reform of teaching methods. By introducing case-based teaching[14], problem-based learning[15], and the flipped classroom model[16], traditional didactic instruction can be transformed into a student-centered, interactive learning environment. These approaches encourage students to actively participate in discussions and problem-solving activities, shifting their role from passive recipients to active constructors of knowledge.

At the same time, the integration of modern educational technologies—such as online learning platforms like Wisdom Tree and University Catechism—expands students' access to independent learning beyond the classroom. Additionally, the use of group discussions, brainstorming sessions, and other forms of teacher–student interaction fosters a classroom atmosphere that motivates students to ask questions, exchange ideas, and develop critical skills such as independent learning, logical thinking, and innovation. Together, these reforms significantly enhance both the appeal of the classroom and the overall quality of instruction, empowering students to become true explorers and practitioners of knowledge.

3.2 Streamlining content and optimising lesson time arrangement

To address the contradiction between extensive teaching content and limited class time, food hygiene education should strive for teaching efficiency by streamlining content and optimizing the allocation of instructional time. First, modular content design should be implemented, dividing the course into three tiers: core knowledge, elective content, and cutting-edge knowledge. This structure ensures in-depth coverage of fundamental concepts while simultaneously accommodating the personalized learning needs of different students through optional and extended modules[17]. Second, by providing access to online resources—such as up-to-date scientific literature—students can use their extracurricular time to independently explore emerging topics in the field, thereby broadening the scope of their learning beyond the classroom. Finally, clearly defined and targeted teaching objectives are essential for improving classroom efficiency.

Each session should have specific focus areas and well-articulated learning goals, helping to eliminate unnecessary repetition, refine course structure, and enhance the coherence and relevance of classroom content. These strategies collectively aim to improve both teaching effectiveness and students' learning outcomes.

3.3 Strengthening the construction of teaching staff and cultivate dual-teacher teachers

Strengthening faculty development and cultivating dual-qualified teachers is a key initiative for enhancing the quality of food hygiene education. First, university–enterprise collaboration should be actively promoted by establishing long-term partnerships with enterprises and institutions related to food hygiene. These collaborations can offer practical training and industry-based learning opportunities for university faculty, enabling them to gain in-depth insights into real-world industry demands and work environments, thereby improving their practical competence. Second, the

introduction of industry experts can help address the shortage of dual-qualified instructors[18]. Part-time lecturers with substantial hands-on experience—such as professionals from the Centers for Disease Control and Prevention (CDC) or food hygiene regulatory agencies—can be invited to participate in teaching. This not only compensates for the practical experience gap among academic staff but also enhances the applicability and diversity of course content. Finally, it is essential to improve teacher training mechanisms.

Universities should regularly organize professional development programs, including technical skill training, policy briefings, and academic exchange activities in the field of food safety. These initiatives will help faculty stay current with industry trends and emerging technologies, thereby improving their overall teaching competence and professional quality. Together, these measures contribute to the development of a high-level teaching team that integrates theoretical knowledge with practical experience, ultimately advancing the overall quality of food hygiene education.

3.4 Enhance the content of practical teaching and cultivate comprehensive ability

Food hygiene education should deepen and innovate its practical teaching content to cultivate students' comprehensive practical abilities. First, comprehensive experimental projects should be expanded by integrating food safety emergency drills, task-based exercises, and other applied scenarios into laboratory courses. These additions provide students with opportunities to practice emergency response and problem-solving skills in simulated environments. Second, the development of virtual simulation laboratories should be promoted. By leveraging advanced simulation technologies, realistic scenarios—such as foodborne illness investigations or food contamination monitoring—can be recreated. This enables students to conduct highly immersive and analytical operations in a virtual setting, enhancing their practical capabilities and adaptability. However, the development of such virtual simulations requires substantial time and financial investment, which poses challenges for institutions with limited resources. In this context, the National Virtual Simulation Experimental Teaching Curriculum Sharing Platform offers an efficient and cost-effective solution by providing access to shared teaching resources[19].

Additionally, off-campus internship programs should be further enhanced. Strengthening cooperation with food hygiene–related enterprises and establishing high-quality internship bases can provide students with more opportunities for industry-based practice. Such experiences allow students to become familiar with actual workflows and significantly improve their performance in complex real-world settings. Collectively, these reform measures can effectively address the existing shortcomings in practical training and better equip students with the professional competencies needed to succeed in the food hygiene field.

3.5 Building a scientific and diversified teaching evaluation system

The establishment of a scientific and systematic teaching effectiveness assessment system is a

crucial means of evaluating the impact of educational reforms and achieving continuous improvement[20]. As shown in Figure 1, the assessment system should be multi-dimensional, comprehensively covering students' mastery of theoretical knowledge, enhancement of practical skills, course feedback, and long-term career development impact to ensure the completeness and scientific rigor of the evaluation outcomes. First, multi-dimensional assessment indicators should be developed. Students' understanding of core food hygiene knowledge—such as causes of foodborne illnesses, diagnostic approaches, emergency protocols, and relevant regulations—can be assessed through written examinations.

These assessments should emphasize both knowledge comprehension and application, incorporating open-ended and case-based questions to strengthen students' critical and integrative thinking skills. For practical skills, evaluations should focus on students' performance in both simulated and real-world scenarios, measuring competencies such as responsiveness, execution ability, data analysis, and teamwork. This can be achieved through composite scores derived from virtual simulation experiments (e.g., task completion, procedural accuracy, result interpretation) and embodied task exercises (e.g., task division, execution effectiveness, emergency collaboration, and quality of reflection). Second, formative (process-based) evaluation should be strengthened by including indicators beyond final exam results—such as students' classroom engagement, experimental performance, and behavioral data from online learning platforms. This allows for a more holistic understanding of students' learning processes and progress. In addition, student feedback should be systematically collected through tools such as questionnaires to evaluate their satisfaction with course content, instructional methods, teaching staff, and overall learning experience.

These data provide valuable insights for ongoing course optimization. Finally, graduate follow-up surveys should be conducted to evaluate the alignment between curriculum content and real-world occupational demands. This can be achieved through graduate questionnaires, telephone interviews, and employer surveys that assess graduates' professional competence, practical abilities, and workplace readiness. The insights gained should be used to iteratively refine and adjust the curriculum to ensure that the teaching reforms remain relevant and effective. This scientific and diversified teaching evaluation system not only provides a comprehensive picture of students' learning outcomes but also offers robust support for cultivating high-quality food hygiene professionals and driving the continuous enhancement of teaching quality.

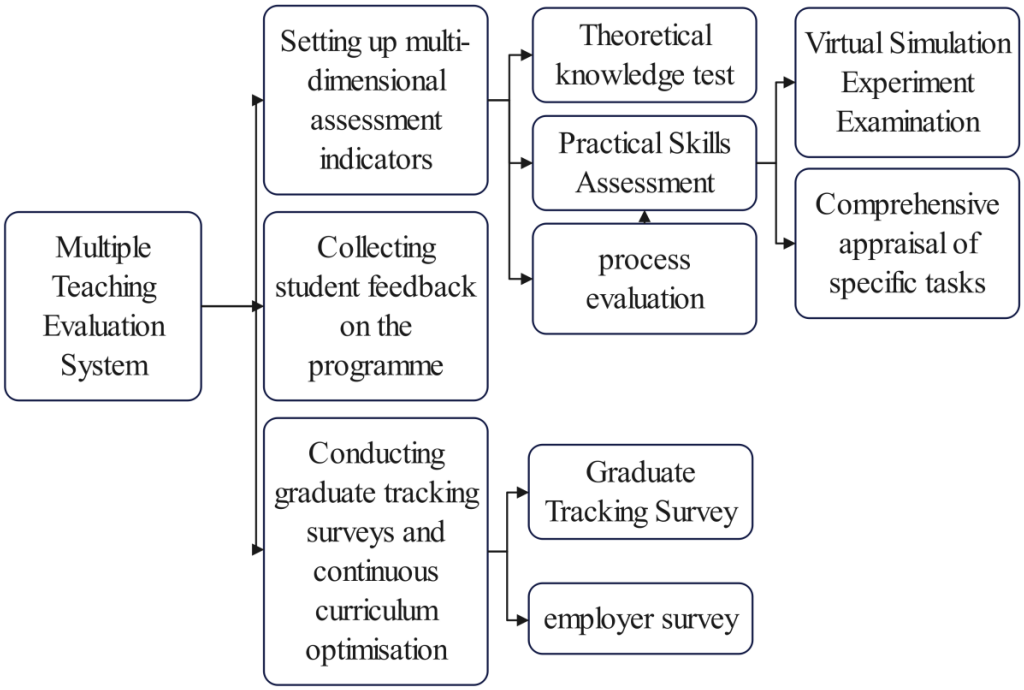

Figure 1. Multiple Teaching Evaluation System

4. Conclusion

Guided by the strategic goal of Healthy China, the reform of food hygiene education has become a central task in enhancing the quality of preventive medicine training. This study provides a comprehensive analysis of the current challenges and reform strategies in food hygiene teaching, focusing on teaching methods, content streamlining, faculty development, practical skills training, and the construction of a scientific evaluation system. By adopting diversified instructional approaches, optimizing course content, strengthening practical components and university–enterprise cooperation, and establishing a robust teaching effectiveness evaluation system, existing issues in food hygiene education can be effectively addressed. These measures collectively support the cultivation of high-quality professionals equipped with both comprehensive knowledge and strong practical abilities in the field of food hygiene.

Looking ahead, greater integration of virtual simulation technologies and embodied task-based teaching models is essential to continuously innovate instructional methods, optimize resource allocation, and promote the seamless integration of theory and practice. Simultaneously, attention should be given to the development of a dynamic feedback mechanism that incorporates multi-dimensional evaluations from students, faculty, and employers. Such feedback will enable continuous refinement of curriculum design and teaching practices, better aligning educational outcomes with the evolving societal demand for food hygiene professionals and contributing meaningfully to the advancement of a healthier China.

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