

# Reform Practice of Innovative Teaching Mode in the Course of Modern Food Detection Technology

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**Abstract:** “Modern Food Testing Technology” is a highly distinctive and practical course in the training system of food related professional courses. This course has the characteristics of abstract concepts, strong practicality, wide range of disciplines, multiple and complex key theories. With the rapid development of food testing technology, the old traditional teaching mode is no longer suitable for the current teaching of this course. In order to enhance the teaching efficiency, improve the teaching environment, and assist students to achieve a greater mastery of the content of this course, it is extremely necessary to reform and practice this course. This paper will develop different teaching methods through innovative teaching mode to reform the practice of this course, aiming to improve the efficiency and quality of teaching activities of food detection technology, ensure the orderly development of food detection work, and cultivate more high-quality innovative and application-oriented talents.

**Keywords:** Modern Food Detection Technology, Innovation, Teaching Mode, Reform, Practice.

## 1. Introduction

As one of the important professional courses in the field of food science and engineering, modern food detection technology is an important component of cultivating and developing the comprehensive knowledge structure and abilities of engineering and technical talents in this field. At the same time, it is also the technical and theoretical foundation of numerous food professional courses. Therefore, mastering the course of modern food detection technology is particularly important. This course covers a wide range of topics, including the processing, storage, circulation, and consumption of food raw materials. Moreover, it covers a wide range of knowledge and involves multiple disciplines. Students are also required to demonstrate a superior knowledge of basic theories, fundamental concepts, and practical skills in the field of food science and engineering after completing the course. In the course of modern food detection technology, emphasis is placed on introducing modern molecular biology detection methods, physical detection methods represented by non-destructive detection, instrument analysis detection methods, and other detection methods; require attention and strengthen the expansion and updating of food detection content and methods to ensure the provision of modern cutting-edge food detection technologies. However, in the traditional classroom teaching mode, the one-way teaching by teachers, low classroom activity, and untimely classroom teaching feedback have led to the issues of low motivation of the students in the course, low learning efficiency, stagnant cooperation between groups, heavy classroom atmosphere, and insufficient understanding of the course content among the students [1]. Based on these issues, it is particularly important to reform and practice innovative teaching in modern food detection technology courses.

## 2. Teaching Significance under Innovative Teaching Models

As a key construction course for the majors of food quality

and safety, as well as food science and engineering, modern food detection technology is highly practical and closely related to scientific research. Based on the limitations of traditional teaching methods, the innovative teaching mode of modern food detection technology has emerged. We ought to constantly promote the reform of this course with the times [2], which is of great teaching significance.

### 2.1. Improving Teaching Efficiency

At present, innovative teaching models have become a trend of the times, and some courses fully utilize the information, openness, and diversification characteristics and advantages of online resources. By explaining abstract concepts in a visual way, the learning efficiency of the courses is effectively improved, which helps students understand the course concepts and knowledge. At the same time, innovative teaching models also enriched the teaching skills of teachers, real-time grasp of teaching progress, which is beneficial for teachers to activate the classroom atmosphere, students to concentrate, improve students' enthusiasm, and greatly improve teaching efficiency.

### 2.2. Enhance Students' Ability to Combine Theory and Practice

With the continuous development of China's economy and the increasing improvement of people's living standards, food safety issues have become a hot social topic of concern. Strengthening the practical learning of modern food detection technology not only helps cultivate students' professional ethics, strengthen their sense of social responsibility, and establish good ideological and moral character, but also stimulates students' curiosity and learning interest in the combination of experimental and theoretical courses, enhances their practical skills, and enhances their innovative ability in food detection technology.

### 2.3. Connect with Daily Life and Pay Attention to Current Events

The main focus of this course is to introduce different

ingredients in food and explain detection techniques. During the classroom teaching process, teachers can combine the course content with daily life in real-time to enhance students' deep understanding of detection techniques. For example, the emergence of novel coronavirus and its widespread infection have become a hot topic in recent years. In view of the adverse impact of this problem on life and work, it can help students correctly recognize and understand novel coronavirus, and learn the technology for its detection through explaining to students the current detection methods for novel coronavirus to students, analyzed the development trend of novel coronavirus detection technology in recent years. At the same time, this process also attracts students' attention and sensitivity to current events, and cultivates students' ability to think independently.

## **2.4. Establishing Correct Values**

With the continuous development of the economy, food safety issues have become a hot topic of concern in society. Food safety is different from other safety issues, as its quality and safety are directly related to the life safety and physical health of consumers. Therefore, after completing this course, as a student majoring in food science and engineering, it is particularly important to establish correct values, and students must possess good professional ethics. As a practitioner in the food industry must consciously abide by the corresponding laws and regulations, never sell seconds at best quality prices and to mix the spurious with the genuine. At the same time, in actual course teaching, teachers must cite major incidents of food safety issues in recent years, such as melamine milk powder, gutter oil, Sudan red and other malicious food safety incidents, to educate students to hold the bottom line and establish correct values.

## **3. Enrich Teaching Methods, Implement Reform and Innovation**

In order to ensure innovative talent cultivation, teachers must enrich teaching methods and implement reform and innovation, so that students can focus their attention and actively study food majors [3]. The teaching process must highlight the difficulties and key points of the course, conduct teaching research from the perspective of innovative teaching models, break traditional teaching thinking, use various teaching methods to implement reforms, and provide reference for improving the teaching quality of modern food detection technology courses [4].

### **3.1. Project based Teaching**

In the course of modern food detection technology, the technical content emphasized includes: PCR (Polymerase Chain Reaction) gene amplification technology, nucleic acid probe technology, biochip technology, immunological detection technology, food non-destructive detection technology, etc. The characteristics of these detection technologies are that they have high theoretical content and difficulty mastering abstract concepts. Adopting the traditional model of teaching and conducting purely textual explanations to make students understand the concepts can lead to further obscurity of the theoretical concepts. Therefore, teachers can use specific projects for teaching to visually demonstrate the practical application of corresponding detection technologies, and mentor and guide students to apply for corresponding projects based on local production

characteristics. For example, in Shandong, the practical application of technology in this course is combined with the vigorously developed agricultural and fruit and vegetable industries, and corresponding projects are constructed by combining detection technology with the requirements of pesticide residue detection in fruits and vegetables, canned food detection, and other related fields. In this context, students organize corresponding teams based on different issues and market pain points, conduct surveys and research on relevant enterprises, conduct interviews and inquiries with corresponding technical personnel, and provide product feedback to consumers [5]. By utilizing this, it helps to cultivate students' ability to think independently and collaborate in teams, solidify their theoretical foundation, improve their practical skills, and stimulate their interest in learning. On the one hand, teachers use examples of their own research related projects in the classroom to vividly explain corresponding technologies to students. On the other hand, teachers can apply for various scientific research projects through corresponding school enterprise cooperation platforms, and provide opportunities for students to collaborate and practice in teams during the projects. Meanwhile, in some well-established enterprise implementation projects, students are given the opportunity to learn from the production detection frontline [6]. Through practice, it can ensure that students are familiar with the steps and processes of detection technology, understand the use of relevant detection instruments, master how to analyze and process testing data, and provide corresponding learning opportunities for future career planning. It is particularly important for cultivating high-quality talents in food science and engineering.

### **3.2. Teaching by Specialized Teachers**

In the course of modern food detection technology, emphasis is placed on explaining modern molecular biology methods, physical methods represented by non-destructive detection, instrument analysis methods, and other methods. Based on the extensive content of detection technology involved in the course, the teaching under the innovative mode is adopted to divide the course detection technology into multiple course units, and the course is divided into individual technical explanations. For example, PCR gene amplification technology, nucleic acid probe technology, biochip technology, immunological detection technology, food non-destructive detection technology, etc. are taught by specialized teachers, who teach different courses based on personal research experience and related projects to explain familiar detection technologies. Through this teaching method, it ensures the maximum teaching efficiency of teachers, satisfies each teacher's full familiarity with individual teaching content, and ensures that there are sufficient project examples to explain enzyme concepts to students. At the same time, teachers cite one's own projects and articles to further explain and introduce the technology. Through this method, teachers can effectively improve their teaching level, satisfy students' curiosity, and strengthen their ability to combine theory with practice.

### **3.3. Establishing Research Forums**

The traditional teaching mode of knowledge impartation and skill training as failed to meet the demand for mastery the concepts and content of the course technology. It is also necessary to adopt academic communication, constantly

actively create knowledge, and ensure that students can seek truth, distinguish truth from falsehood, and collide with new ideas among themselves, which is the key point of this course. Therefore, the establishment of a teaching model for scientific research forums is particularly important, especially the academic exchange and thinking exchange that combines relevant theories and practices. It is an effective way to explore ideas, understand cutting-edge academic topics, and research corresponding technical methods. The undergraduate student union and graduate student union can take turns in organizing, with invited reports from college experts and scholars. Key papers related to detection technology can be promoted and posted, and different forms of communication such as group discussions and themed salons can be adopted. In the forum atmosphere, it can stimulate students' research interest, cultivate their positive thinking ability, and create a good academic atmosphere.

### 3.4. Innovative Multi-media Teaching

There are many abstract and obscure concepts in modern food detection technology courses. Teachers in the classroom that merely give a textual account or repeat content from textbooks and courseware are unable to articulate these abstract difficulties clearly and succinctly. It is extremely necessary to reform and innovate in multimedia teaching. Enhance the understanding of the course for students through the repeated visual use of animation and images. For example, explaining Southern blot hybridization in nucleic acid probe technology in this course, its essence is a hybridization technique for detecting DNA on the membrane, but the steps of this method are complex, including DNA denaturation, neutralization, southern blotting, pre hybridization, hybridization, membrane washing, detection of hybridization signals, and other multiple processes. Teachers can use drawing software such as AutoCAD and Solidworks to prepare planar two-dimensional and three-dimensional diagrams, and visually and clearly create operational diagrams for each step to deepen students' understanding of this hybrid technology. Using animation and images as teaching aids, help students break down abstract concepts into vivid and vivid images, deepen their understanding of the steps and links of the technology, and thus deepen their mastery of the knowledge of this course.

### 3.5. Efficient Utilization of Social Software

With the rapid development of social science and technology, the emergence of social software facilitates people's communication and communication. Whether it is the mass social software based on QQ and wechat, or the social software such as Tencent Conference and DingTalk that have emerged in recent years, they provide a guarantee for the feedback of classroom results. With the help of these social software, before the start of each class, the teacher will first preview the courseware and learning cases to the students, so that students can preview the relevant content before class, students will be left in class or difficult problems in the preview review in the group feedback to the teacher, the teacher will explain the relevant problems and difficulties of the course in a specific way. For example, in the course of modern food detection technology, the mastery and application of PCR technology is a major difficulty in this course. The technology includes basic elements such as template, primer, DNA polymerase, substrate, magnesium ion, etc. The teacher explains the technology by recording video

micro-lessons and uploading it to the social software group. Students can repeatedly watch the teacher explain the Microcourse, which helps to digest the difficulties of the technology. The efficient use of social software is conducive to improving the communication efficiency between students and teachers, enabling students to clearly grasp the theoretical concepts of modern food detection technology and the experimental operation of related technologies, which is conducive to enhancing students' enthusiasm for this course, activating the learning atmosphere in the classroom, stimulating students' learning interest, and thus improving class efficiency [7].

### 3.6. Provide an Online Virtual Simulation Experimental Platform for Learning

As a course that discusses multiple cutting-edge technology theories, this course places special emphasis on the combination of theoretical technology and practical experiments. Under traditional teaching methods, there may be situations where all courses are completed before conducting separate experiments. Based on this situation, there may be multiple technical steps that are complex and confusing, and after the experiment, students may have low mastery of the technology and may not have a clear understanding of the actual experimental steps. Simultaneously, due to the impact of the epidemic, offline experimental classes may be postponed to the next semester, or even cancelled. In response to these issues, great attention should be paid to and the development of online virtual simulation experimental platforms to provide learning for students. The online platform for virtual simulation presents a virtual experimental environment through the current popular internet technology [8]. Students can conduct virtual experiments on related technologies on this online platform, greatly reducing the loss of experimental materials and waste of experimental manpower in this environment. Students can use this platform to repeat experiments multiple times to consolidate their understanding of related technologies, which is beneficial for stimulating their interest in learning related technologies, enhancing their enthusiasm for learning experimental technologies, and continuously improving their ability to combine theory with practice.

## 4. Conclusion

The course of Modern Food detection Technology is a highly distinctive and practical professional course in the food course system of food quality and safety, food science and engineering, etc. The focus of this course is to introduce different ingredients in food and explain detection techniques. Therefore, it is necessary to ensure that the course content of new detection methods and safety rapid detection technologies remains at the cutting edge. With the rapid development of food detection technology, the emergence of new educational concepts, and the continuous development of modern teaching methods, this article adopts innovative teaching models for reform and practice. In response to the current problems of the course of Modern Food detection Technology, various teaching methods have been proposed to address the current issues in this course for reference by major universities, thereby meeting the needs of cultivating high-quality comprehensive talents that meet the needs of the times.

## Acknowledgments

The work was supported by the support of Undergraduate Teaching Reform Research Project of Shandong Province (No. M2023021), Undergraduate Teaching Reform Research Project of Qilu University of Technology (No. 2023zd11), Training Program of Innovation and Entrepreneurship for Undergraduates of Shandong Province (No. S202310431030), the Science, Education and Industry Integration Project of Qilu University of Technology (No. 2022PY070), and Key Supporting Regions Introduce Urgently Needed Talent Projects of Shandong Province (No. 2309-371724-89-01-660290).

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