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# Practical Exploration of Online Teaching of Animal Product Processing

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**Abstract** Online teaching has become an important part of higher education due to the continuous effects of the global COVID-19. In this paper, the online teaching of Animal Product Processing was designed and implemented from three aspects of optimization of online teaching content, organization of teaching process and implementation of online assessment. According to the analysis of the questionnaire survey and the final evaluation results, the online teaching of Animal Product Processing is well received by the students and has achieved good teaching results, providing a useful reference for colleges and universities to carry out in-depth online teaching of Animal Product Processing.

**Key words** Animal product processing, Online teaching, Practical exploration

## 1 Introduction

Since the outbreak of the Corona Virus Disease 2019 (COVID-19), online teaching has become an important part of the education work in universities and colleges. In response to the unified deployment of "continuing teaching and learning while suspending classes" by the Ministry of Education, colleges and universities have taken multiple measures to actively carry out online teaching and steadily promote education and teaching work.

Animal Product Processing is an application-oriented course combining science, engineering and agriculture, mainly teaching meat, egg and milk processing and comprehensive utilization of by-products<sup>[1]</sup>. The course is rich in content, covers a wide range and has strong application. As the core course for undergraduates majoring in food, it is an important unit to achieve the cultivation goal of talents majoring in food engineering. It not only requires students' theoretical knowledge and practical ability, but also requires teachers' teaching methods. In the teaching process of the course, attention should be paid to the trinity combination of theory, practice and production<sup>[2]</sup>. Under the influence of the COVID-19 epidemic, course teaching has been transferred from offline class to online class. The difficulties of supervision, interaction and practical activities in online class have also brought great challenges to the teaching methods of Animal Product Processing. Therefore, during the online teaching of Animal Product Processing, how to realize the effect of offline teaching through

online resources and ensure the smooth completion of teaching tasks is an urgent task.

## 2 Challenges of online teaching

Compared with traditional offline classroom teaching, the online teaching based on network and digital media brings great challenges to teachers and students<sup>[3]</sup>. Firstly, online teaching requires teachers and students to be familiar with the online teaching platform, understand and master all kinds of functional modules and operational skills of online education system in a short time, so as to effectively implement teaching and improve students' classroom experience. Secondly, due to the restriction of software platform, online teaching lacks a positive interactive atmosphere. Compared with one-dimensional offline class, online class is difficult to achieve direct face-to-face interaction in the face of multi-subject and multi-dimensional complex teaching, and the classroom atmosphere is difficult to reach the enthusiasm of offline teaching, so that it is very easy to fall into remote cramming teaching. Thirdly, it is difficult to organize and supervise online teaching. In offline teaching, teachers can timely optimize teaching strategies and educational management based on students' classroom activity, response speed and concentration, so as to improve the pertinence and effectiveness of teaching and strengthen classroom teaching effect through interaction. During online teaching, teachers cannot track and fully grasp students' learning situation in real time, are difficult to establish the course reminder and tracking mechanism, and cannot realize the dynamic organization and management of classroom teaching.

## 3 Design of teaching program

As a branch of food science and engineering disciplines, animal product processing is a subject that reflects the scientific theory and technology of modern animal product processing, and is of great significance to the scientific research and personnel training of animal product processing. In order to adapt to the teaching needs of this discipline and the needs of scientific research and in-

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dustry, we have made an active exploration in the planning of the teaching program.

**3.1 Optimization of teaching content** Animal product processing has a wide range of research and a complex knowledge system. It requires students to master the processing principles, processing methods and quality control technology of meat, eggs and milk, and mainly trains students' ability to use their knowledge to solve practical problems. Therefore, it is necessary to optimize the huge and complex knowledge system. Based on modern animal product processing technology, guided by the construction of animal product processing quality and safety control system, this online teaching content of Animal Product Processing covered the processing principles, processing technology and quality safety control of various animal products. In the optimization of the teaching content, the situation of students mastering knowledge points was divided into three levels: mastering, knowing and understanding, and the mind map of teaching knowledge and the supporting courseware were prepared. In terms of content presentation, background information support, illustrated courseware, animation presentation of key and difficult contents and video playback were combined to help students understand and remember the teaching content<sup>[4]</sup>.

**3.2 Organization of teaching process** Teaching process, which is an important part of teaching activity, is an important guarantee of the whole teaching activity, and reasonable teaching process design has positive significance to improving teaching effect. In the online teaching of Animal Product Processing, pre-class preview, classroom teaching and after-class consolidation were designed.

**3.2.1 Design of pre-class preview.** First of all, the "super star learning platform" of Chengdu University was used to create Animal Product Processing, into which the course schedule, course introduction, syllabus, course schedule, teaching knowledge mind map, electronic textbooks, supporting courseware and all kinds of expanded materials (including video materials of introduction of various animal product processing and production workshops, processing process flow, operation principle of key equipment, *etc.*) were imported. Students can directly download relevant materials from the course for preview, which can not only improve students' online learning efficiency, but also enhance students' ability to connect theory with practice. In addition, a class group of the online teaching course was also set up to release course information in time, and the mind map of teaching knowledge was sent to the class group one day before each class, so that students can have a preliminary understanding of the teaching content and learning objectives of this course, and do a good job of pre-class preview.

**3.2.2 Design of classroom teaching.** According to the three levels of mastering knowledge points, the online classroom teaching process of Animal Product Processing was designed by using the teaching method of theory teaching as the main part and practice teaching as the supplement (such as sharing an enterprise production example), as well as teacher teaching as the main part and

student sharing as the supplement. In order to improve the experience of online teaching, firstly, it is needed to choose an appropriate online teaching platform, and lead students to conduct online trial classes before the class starts, so as to ensure that students can proficiently use the functions of the software in class; secondly, 30 min before class, the classroom teaching link and sign-in link should be sent to students through the class group to remind students of the class time and urge students to sign in, so as to ensure that students can enter the class as soon as possible; finally, a pre-lecture is conducted within 10 min before the formal class to debug the equipment. In the process of online teaching, the role of teachers has changed from the knowledge disseminator of face-to-face teaching to a leader who guides students' online learning, and their main task is to promote students' learning, rather than just impart knowledge to students. Therefore, in the formal teaching process, in addition to sharing courseware and teaching knowledge points through a screen, teachers should also mainly guide students to solve the problems found in the preview process, and set 2–3 times of online discussion and answering questions per class. While solving students' problems, teachers can also enhance students' participation in online class, improve the learning atmosphere of online class, and avoid students' visual fatigue, mental relaxation and inattention.

**3.2.3 Design of after-class consolidation.** After the online theoretical course, after-school thought questions or thematic discussions would be timely published on the online teaching resource platform, so that students can use the knowledge learned in this class to answer them. For example, a slice diagram of a sauce meat product can be given, and students analyze the quality problems of this product, the reasons for these quality problems, and the ways to effectively solve the above problems. Through the analysis of students' answers, teachers can not only understand students' understanding of the explanation content, but also students' interest in learning animal product processing can be stimulated. Meanwhile, the distance between the theoretical knowledge of animal product processing and its practical application can be shortened.

**3.3 Implementation of online assessment** The theoretical examination of Animal Product Processing mainly tests students' grasp of the basic knowledge of animal product processing and its application. As the online examination mode would be adopted, it is necessary to consider the fitness of test questions and the system, and the convenience of students when answering questions. In terms of question type setting, the score ratio of objective questions and subjective questions was 4:6, including single-choice questions (10%), multiple-choice questions (10%), fill-in-the-blank questions (10%), judgment questions (10%), noun explanation questions (12%), short answer questions (24%), and essay questions (24%). In order to improve students' familiarity with the online examination platform and ensure that students can adapt to and complete the online answer within the prescribed time, a 1:1 mock examination was designed. During the examina-

tion, students logged in the "super star learning network platform" through the mobile APP to answer questions. Candidates are forbidden to capture the screen while answering questions, and the camera was kept on all the time. Teachers can set real-time invigilation through the camera and platform to prevent cheating.

4 Evaluation of online teaching

**4.1 Questionnaire evaluation** In order to analyze the effect of online teaching of Animal Product Processing and further improve the online teaching program of Animal Product Processing, 64 students majoring in food science and engineering since 2019 in Chengdu University were surveyed by questionnaires, and the main survey contents included overall satisfaction, acceptance of

online learning, learning enthusiasm, interaction and network situation. As can be seen from Table 1, on the whole, students are satisfied with online teaching and can accept online learning as a new teaching method. However, from the perspective of learning enthusiasm, a small number of students think that their enthusiasm for online learning is not as good as offline classroom learning. From the perspective of interaction, quite a few students still think that online learning cannot achieve a good interaction effect. Finally, all the students do not encounter any learning difficulties caused by the Internet during the whole online learning process. Hence, in the online teaching process of Animal Product Processing, improving students' learning enthusiasm and classroom interaction are two major problems that still need to be paid attention to in the future.

Table 1 Questionnaire results of online teaching of Animal Product Processing (n = 64)

Survey content	Very good	Good	General	Poor	Very poor
Overall satisfaction	11 (17.2%)	39 (60.9%)	14 (21.9%)	0 (0.0%)	0 (0.0%)
Acceptance of online learning	4 (6.3%)	42 (65.6%)	18 (15.6%)	0 (0.0%)	0 (0.0%)
Learning enthusiasm	0 (0.0%)	31 (48.4%)	30 (46.9%)	3 (4.7%)	0 (0.0%)
Interaction	0 (0.0%)	23 (35.9%)	29 (45.3%)	12 (18.8%)	0 (0.0%)
Network situation	0 (0.0%)	49 (76.6%)	15 (23.4%)	0 (0.0%)	0 (0.0%)

**4.2 Analysis of students' score** From the scores of 64 students majoring in food science and engineering since 2019 in different types of questions, it can be seen that the scoring rate of single-choice questions, multiple-choice questions, fill-in-the-blank questions and judgment questions exceeds 90%, indicating that students have a good grasp of the basic knowledge of animal product processing. However, the scoring rate of noun explanation questions is less than 80%, showing that students' understanding of some professional terms is still not thorough. Short answer and essay questions mainly test students' ability to solve and analyze practical problems, and the scoring rate is 78.8% and 64.9%, respectively. Therefore, students' ability to apply the knowledge related to animal product processing to practice needs to be further improved.

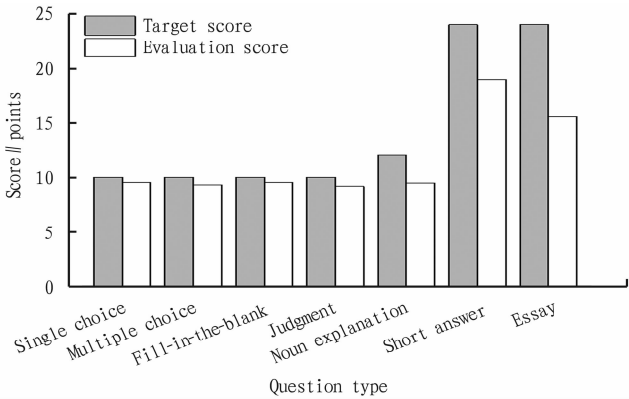


Fig.1 Scores of students majoring in food science and engineering since 2019 in different types of questions

5 Conclusions

Animal product processing is a practical and highly applicable

subject, and needs to combine theoretical knowledge with practice in teaching, which is a huge challenge for online teaching and requires teachers to pay attention to the integrity and systematization of the curriculum. In addition to preparing the teaching resources of traditional offline teaching, it is also necessary to carefully design all aspects of online teaching, including the optimization of teaching content, the organization of teaching process and the implementation of online assessment, so as to improve the level of online teaching of Animal Product Processing and the quality of undergraduates majoring in food.

First of all, it is necessary to optimize the teaching content according to the characteristics of the online teaching platform, make full use of the advantages of the online teaching platform, give full play to the overall function to make up for the deficiencies of online teaching, and stimulate the enthusiasm and initiative of students. Secondly, effective online teaching process organization is the core of the whole online teaching. Compared with offline classroom teaching, online teaching is not a simple transfer of time and space, but a transformation of the whole teaching mode. Its biggest obstacle is that teachers cannot know the learning situation of students in real time. Therefore, in the online teaching process of Animal Product Processing, classroom interaction, questioning, discussion, testing and other links are essential. Finally, reasonable online assessment design is the feedback of the evaluation of the whole teaching process. Objectively, it is necessary to use the online examination system to assess students at the end of the semester. Emotionally, it is necessary to establish the feedback mechanism of online teaching from students. Specifically, the advantages and disadvantages of online teaching can be summarized by issuing questionnaires to make timely improvement.

To sum up, in order to adapt to the online teaching of Animal (To page 59)

the recruitment of exiled people was the first prerequisite for solving all the problems after the war.

**4.2 Restoring agriculture and building water conservancy projects** According to the *Chronicles of Korla City*, Qarqi is located at the southern foot of the Tianshan Mountains and on the northeast edge of the Tarim Basin. The land in Qarqi is fertile, the climate is mild, the sunlight is sufficient, the temperature difference between day and night is large, and the frost-free period is more than 180 d. However, at that time, due to the chaos of war, everything of Qarqi area was waiting to be taken up. The Monument for Building Qarqi Canal mentioned that besides the whole battalion of soldiers, Wang Yulin used his own money to hire folk men and craftsmen, supply food and pay wages every day, hoping to repair the Qarqi canal as soon as possible and restore the agriculture. In addition, river canals were also built in Kaxkar, Yakan, Hami, Barkol, Guchengzi, Urumqi, Manas, Turpan, Karaqal, Korla and other places, and karez was also built in Turpan.

**4.3 Establishing the rehabilitation bureau** In the third year of Guangxu's reign (1877), after the Qing army expelled the invading army of Mohammad Yaqub Beg and recovered Xinjiang, in order to restore and develop agriculture and water conservancy, ensure the supply of food and grass for the army, and carry out various rehabilitation works, Zuo Zongtang and others set up temporary ruling institutions in various places in Xinjiang, namely, the rehabilitation bureau. The Xinjiang rehabilitation bureau was divided into a general bureau and a branch bureau. It was first established in the Northern Xinjiang Township Organ (Didao), and later expanded to Turpan and other cities in southern Xinjiang. By July of the ninth year of Guangxu's reign (1883), a total of ten rehabilitation bureaus had been established in Xinjiang. Liu Jintang took the charge of each rehabilitation bureau, so that the work of the rehabilitation bureau could be cooperated with the soldiers in the battalion. These made Xinjiang, which was dilapidated and desolate in the past, into a land of prosperity, and Xinjiang's agri-

culture and water conservancy gradually recovered and developed rapidly.

In addition to the above measures, the Qing government also implemented other policies to restore agriculture in Xinjiang. For example, Liu Jintang's *Mintun Regulations* stipulated that regardless of father and son, brothers or companions, money could be lent for farm tools, house repairs, cattle, and seeds. The conditions offered were very preferential. Basic means of living (food, housing) and means of production were provided by public loans. Even a very poor person could start labor and production as long as he borrowed from the public according to the regulations.

## 5 Conclusions

The Monument for Building Qarqi Canal recorded in detail that the Qing army appeased refugees in the north and south of the Tianshan Mountains, restored farmland, and established the Xinjiang rehabilitation bureau to carry out rehabilitation work, as well as Qarqi's soldiers of the Qing army repairing the canal. It reflected the situation that the soldiers and civilians of all ethnic groups in Xinjiang fought side by side to jointly develop and build frontier farmland and water conservancy, build an agricultural economy, and rebuild their homes. These once again set off a climax of developing Xinjiang, which laid the foundation for the rapid development of agricultural development and water conservancy in Xinjiang during the Guangxu's reign.

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Product Processing under the new situation, make up for the shortcomings of online teaching, and improve the quality evaluation system of online teaching, it is especially necessary to optimize the teaching content, organize the online teaching process and design the online assessment, so as to improve the teaching quality of Animal Product Processing. There is still a lot of variability in online teaching in the future, not only for Animal Product Processing, but also for other core courses of food major. It is hoped that this paper can provide some reference for online teaching of food major in colleges and universities.