

Study on Reform of Experimental Teaching System of Animal Physiology

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Abstract. The experimental teaching plays an important role in mastering and understanding the theoretical knowledge of animal physiology. The students of Animal medicine and animal pharmacy in Jilin Agricultural University as the subjects of the experiment, the experimental teaching system of animal physiology was reformed by changing the teaching mode, improving teaching methods, reintegrating the open national pilot project, and improving the method of experimental examination. The purpose is to explore a new experimental teaching system coincides with agricultural universities, and it will lay a theoretical foundation for innovative spirit, practical ability and quality education of college students.

Introduction

Animal physiology, which studies the phenomenon and laws of animal life activities, is an important basic course for Animal majors in the agricultural universities. The most outstanding feature of this course is that its theory is abstract and it pays more attention to experiments. For students who major in animal medicine, animal science and related specialized subjects, our school provides 30 periods for experimental lessons of animal physiology, which occupies 37.5 percentage of total periods. Therefore, experimental teaching is of vital importance for students to understand and master the theoretical knowledge and plays an important role in improving students' abilities of analyzing and solving problems.

As an important part of the course, experimental teaching not only can corroborate theories, but also can make students have a deeper understanding and full mastery of basic theoretical knowledge. What's more, it can help students cultivate their practical ability as well as their ability to think in a creative and scientific way [1]. Thus, experimental teaching is unique and irreplaceable. Nowadays, repeated validation experiments have made up the most of animal physiology experiments. So it has become an important problem in front of teachers that how to connect these classical experiments with improving quality education as well as developing students' creativeness and application ability. For this reason, the members of our research group, with years of teaching experience, carry out following reforms, which aims to explore and build a new system of the experimental teaching of animal physiology that takes cultivate innovation ability as the core and meets the target requirements of animal medicine, animal science and other related subjects of Jilin Agricultural University [2]. In addition, the new system is supposed to lay a theoretical foundation for quality education.

Change the Model of Teaching and Pay Attention to the Experimental Process

In terms of the existing experimental conditions of most laboratories in agricultural colleges and universities, the content of teaching is mostly based on the guidance of verification tests, which will lead to some bad results, and then students do not have a deep understand of the principles of experiments and a full mastery of the experimental process. What's worse, they even don't know how to explain the occurrence of these experimental phenomena. In addition, students' theory will be divorced from practice, and therefore they finally become the ones who have grand plans but little skill. Put more bluntly, they will have a poor practical ability[3]. So how to change this

situation under the existing conditions and fully mobilize students' spirit of exploration to improve students' practical ability? Our group members will solve the question mainly through changing the model of teaching as well as focusing more on the process of experiments.

The first thing what we need to do is letting students prepare for the experiment before class because the preparation before the experiment is the key to the success of the experiment. The preparation is also an important stage at which students are seriously able to understand the content of the experiment. Besides, through the preparation before the experiment, we can let students have a knowledge of the animals needed in the experiment, the preparation process of drugs, the use of the instrument and so on, which plays a key role in the smooth development of the experiment and lays a solid foundation for the further study of students. Secondly, each class should be divided into six groups, with each group as a unit, so all the students will have the opportunity to participate in the experiment, carry out their duties in the process of the experiment and cooperate with each other to complete the experiment. In this way, we can fully mobilize the students' enthusiasm. Finally, students will sum up the experimental results and data in groups. With regard to the experimental report, students are required to complete it alone[4]. In other words, they are not allowed to copy, which fully mobilize the enthusiasm of students and further exercise the ability of students to think independently.

It is paying attention to the process of the experiment mode that make students are really involved in the whole experiment process, which plays an important role in cultivating students' ability to observe, and do experiments. At the same time, it helps improving students' ability of practice and thought. Therefore, it is worthy to be promoted and taken as a reference by colleagues in other universities.

Improve the Teaching Method, Apply the Advanced Teaching System to the Experimental Teaching and Optimize the Teaching Environment.

With the rapid development of science and technology, computers are widely used by the public. Meanwhile, most of the physiological experimental instruments are eliminated. In our school, we mainly used [5-6] BL-420F biological function experimental system researched and developed by Chengdu Taimeng Technology Co. This system is a combination of the input, amplification, acquisition and recording of biological signal. Experimental teaching modules designed in this system cover the whole project concerning animal physiology experiments. There are many advantage of the system. For one thing, it is easy to operate and easy to master. For another thing, the show of experimental results is intuitive, simple and quick. Compared with the original one, the new system greatly reduces the time that students spend on analyzing the results. What's more, it can help students devote more time and energy to the experimental process, and then deepen students' understanding and mastery of the experiment. In the experiment, our group members apply both the virtual experiment system and the synchronous demonstration system in the experimental teaching. This system can simultaneously demonstrate the experiments we have done, so that students can be more intuitive and closed to the experience the process of experiments, which plays a positive role in improving students' practical ability.

Integrate Open Experimental Projects and Improve the Utilization of Utilization

The experiment of animal physiology has the features of high precision and operability. In order to improve students' practical ability and the cultivation of creative thinking, our group integrates part of the open experimental project to let students connect biological skills contest with teaching and scientific research. First of all, we will make the preparation of frog sciatic nerve specimen and isolated frog heart perfusion experiments for integration as an open experimental project for students to practice freely [7]. In addition, in this course, we will integrate the experiment of frog heart pacemaker and the experiment of frog myocardial electrophysiological characteristics. At the same time, we save the cost of animal experiments through the integration of experiments, and therefore we will make the best use of it.

In order to improve the practical ability of students, since 2012, our school have organized students to participate in biology experimental skills contest organized by Jilin Province Department of Education, in which the preparation of gastrocnemius muscle specimens and vitro frog heart. The perfusion experiment that are part of animal physiological experiments was included as a mandatory item. In previous competitions, the students in our school have achieved relatively good results and obtained the first prize of Experimental Skills Competition for many times. Therefore, we can see that learning the experiment of animal physiology well does play a key role in the development of students' ability.

Make the Experimental Teaching Evaluation System Perfect and Establish a Diversified Assessment Method

The contents of the experimental course of animal physiology, due to the curriculum system and experimental conditions, the experiments selected are mostly Verifications, which led to the experimental results are mostly predictable [8]. Therefore, for the past the assessment information for course are mainly composed of laboratory report and attendance, which ignore the performance of students on the process of the experiments, students don't take seriously to preview their new lesson and experiment operation, the results of the analysis is not thorough, not in-depth.

In view of this situation, our research group has carried on the reform to the original examination way, through the attendance, the preview, the ability of experiment operation, the experiment report after your course is finished and end-of-term exam by drawing lots to evaluate students' terminal grades.

Five appraisal methods are as follows:

The attendance (using the deduction method). Only students that attended all lessons have the opportunity to complete this experiment. For other students who absented from lessons, their terminal grades are calculated by this formula: their experiment grade divided by a class hour. For example, the proportion of our school Experimental Lesson of Animal Physiology grades is 20%, (20 points), the total 30 hours of the lesson. If who absent a school hour, according to the calculation, his terminal grades will be deducted 0.667 points, a class hour has four hours, the worst result his terminal grades will be deducted 2.67 points, not the floating-point types, is the integer type, and we must deduct 3 points. The deduction method can remind the students of attending lessons on time, which helps teachers plan on arrangement for follow-up experiments.

Preparations for the experiment (accounting for 10% of the total score). Students can better understand and master the purpose, principles, methods and procedures of this experiment through the preparations before doing experiments. In addition, they can look up information in advance when they meet with what they don't understand [9]. In all, making full preparations before doing experiment can let students make rational and effective arrangements for the experiment. It also promotes the students' thinking ability and practical ability. What's more, it increases the timeliness of the experimental process.

Experimental operating capacity (accounting for 30% of the total score), which includes the health of experiments, hands-on operation, the success and such tests. The level of the ability of experimental operation is directly related to the result of this experiment and the condition of discussion between students. As a result, it plays a very important role in the experiment.

Experimental reports (accounting for 40% of the total score). Experimental reports can be used to check if students understand and master the important embodiment of the experiment, which can objectively reflects students' attitude towards experiments. Through analysis and discussion of experimental results, students can combine theory with practice. Besides, students can develop the initiative to think and cultivate the ability to analyze problems and solve practical problems.

Final lottery assessment (accounting for 20% of the total score) [10]. Members of the group make experimental projects related into topic cards in advance, and then students extract cards by random answering the questions. This approach assesses students on comprehensive mastery of experimental skills such as experimental principles, method steps and precautions. In order to achieve good results, students must have a thorough review and mastery of all the experiments,

which deepens students' understanding and application of the course as well as the understanding and mastery of theoretical knowledge. The establishment of assessment that has diversified methods makes students' initiative and innovative thinking is greatly improved. Compared with the experimental results of last year, students' achievements in this year increase by 8% .In addition, the rate of final failure is greatly reduced because the experimental results account for 10-20% of the total score. Therefore, the author believes that full and effective reform of the experimental teaching system not only can improve the practical ability and experimental results, but also can improve the overall performance of the course.

Conclusion

As an important part of the teaching system of colleges and universities, experimental teaching not only can cultivate students' practical ability, but also plays a very important role in helping students understand and mastering the whole course. Therefore, our group members explore and build a new system of the experimental teaching of animal physiology that focuses on cultivating innovation ability and meets the target requirements of animal medicine, animal science and other related subjects of Jilin Agricultural University, which is supposed to lay a theoretical foundation for quality education.

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