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Exploration and Practice of Teaching Reform of Thematic "Veterinary Clinical Diagnosis" Oriented to Service Ability

Haigang Wu, Jinni Liu, Guangqiang Zhang, Xian Wu, Bingjie Ma, Jinzhe Li*

College of Animal Science and Technology, Xinyang Agriculture and Forestry University, Xinyang, China
Email: *359832965@qq.com

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Abstract

To further enhance the role of teaching "Veterinary Clinical Diagnosis" course in the ability of animal medicine students to serve the development of regional livestock and poultry breeding industry, based on years of teaching, scientific research, and scientific and technological services related to veterinary clinical diagnosis, a thematic teaching mode of "Veterinary Clinical Diagnosis" oriented to serviceability was established. The teaching content is integrated into 4 topics, which teachers lecture to consolidate students' professional foundation in the field of veterinary clinical diagnosis and ensure the frontier of the lecture content; around the main range of the 4 topics, combined with the main problems in the field of clinical diagnosis in the process of regional livestock and poultry breeding, eight issues with robust application are set by teachers as the main tasks of students' practical teaching. Students form teams and complete the learning under the guidance of teachers. After that, each group will form the 9 tasks into written solutions and special lectures and give lectures in the classroom in the style of "company + customer"; the assessment team composed by the teacher will score the answers, special lectures, and comprehensive performance of the team as the primary basis of the assessment of the course. Through the above process, the teaching system of "Veterinary Clinical Diagnosis" with service capability as the guide and theoretical-practical integration with special features has been initially constructed. It has been proven that the teaching system not only ensures the frontier and applicability of the teaching content of "Veterinary Clinical Diagnosis", but also stimulates the students' learning interest, which eventually cultivates a large number of high-quality talents who can effectively serve the development of regional livestock and poultry industry.

Subject Areas

Veterinary Medicine

Keywords

Serviceability, Thematic, Veterinary Clinical Diagnostics, Teaching Reform, Exploration and Practice

1. Introduction

"Veterinary Clinical Diagnosis" is a discipline that uses the fundamental theories and methods of animal medicine to diagnose livestock and poultry diseases with the help of modern testing methods and technologies. It is a subject that studies the basic methods and theories of animal health examination and disease diagnosis from the perspective of clinical practice and it is also an important course for cultivating students' clinical thinking ability and practical ability. Therefore, it occupies a very important position in the cultivation of animal medicine professionals [1] [2] [3] [4]. Its main task is to determine the nature and category of the disease and finally determine the name of the disease by taking a comprehensive measure of its various symptoms and changes and considering the etiology, etiology, and pathogenesis, through questioning the medical history, necessary clinical examination and laboratory tests, and then laying the foundation for the subsequent prevention and treatment of livestock and poultry diseases [5]. This course is a course for students of animal medicine, and with the transformation of livestock and poultry breeding to green, large-scale and intensive levels, accurate and rapid clinical diagnosis of diseased livestock and poultry is particularly important. The importance of this course is increasingly highlighted. The quality of its lectures will seriously affect the ability of students of animal medicine-related majors to serve the development of regional livestock and poultry industries [6]. However, "Veterinary Clinical Diagnosis" is a multidisciplinary interdisciplinary subject with extensive content, many fields, and constantly new content and technologies integrated. Its development history is relatively short [7] [8], and in the course of teaching, it is characterized by comprehensive knowledge coverage, strong theoreticality, rather few professional textbooks, fast update of knowledge and technology, the low interest of students in learning, and difficult practical training [9] [10]. In addition, in recent years, under the influence of the policy of creating a "golden course" and eliminating "watercourse" [11] [12], the course of "Veterinary Clinical Diagnosis" in many colleges and universities has been reformed in the direction of "golden course". However, in the process of operation, many colleges and universities do not grasp the law well, and individual colleges and universities even pass the lecture content of Advanced Veterinary Clinical Diagnosis for postgraduates to undergraduates to meet the "gender once" characteristic of the "gold course". "This kind of reform method

of simply and roughly enhancing the difficulty of the course has brought about the consequence of boring learning to students and seriously affected the quality of the lectures of the course [13] [14]. How to improve the gold of the course "Veterinary Clinical Diagnosis"? How to enhance animal medicine students' interest in learning "Veterinary Clinical Diagnosis"? How can the course become an important support for cultivating the ability of animal medicine students to serve the development of regional livestock and poultry industries? The author believes that reforming the education and teaching of "Veterinary Clinical Diagnosis" with serviceability as the orientation is a relatively good way to achieve this.

2. Established a Thematic "Veterinary Clinical Diagnosis" Education and Teaching Reform Model Oriented to Serviceability

Based on years of teaching experience in "Veterinary Clinical Diagnosis", combined with my research accumulation and scientific and technological service experience in poultry clinical diagnosis and diagnosis, the author determined the guiding idea of service-capability-oriented thematic teaching of "Veterinary Clinical Diagnosis" based on comprehensive and in-depth study and comprehension of the report related to "Building China's Golden Course" by Wu Yan, director of the Department of Higher Education of the Ministry of Education. The specific model is shown in **Figure 1**, that is, taking the cultivation of animal medicine students' serviceability in the livestock and poultry breeding industry as the

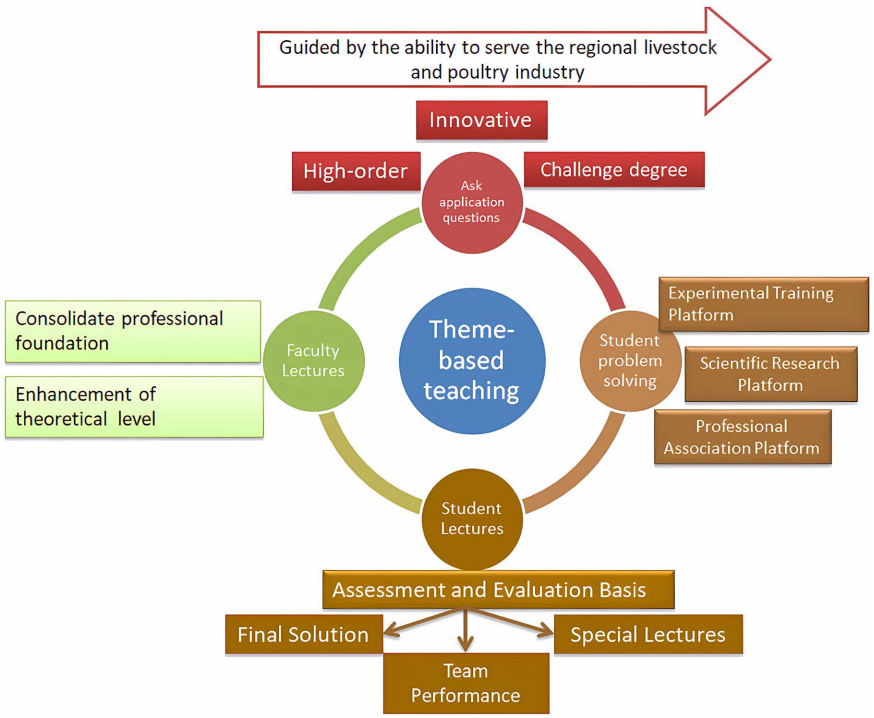

Figure 1. Thematic "Veterinary Clinical Diagnosis" education and teaching reform model oriented to serviceability.

guide, taking teachers as the leader and students as the center, through carrying out lectures on topics related to "Veterinary Clinical Diagnosis", consolidating students' professional foundation about livestock and poultry disease diagnosis, cultivating their essential professionalism and improving their theoretical level; after the lectures of teachers, according to "Golden Lesson", the "Gender One Degree" is set. After the classes of teachers, according to the principle of "One Degree of Gender" developed by the "Golden Lesson", the students will be given applied and cutting-edge questions about the common diseases in the livestock and poultry breeding industry in recent years, combined with the new knowledge and technology in veterinary clinical diagnosis. With the help of various experimental animals provided by the professional association of the college—the breeding association, and with the experimental training platform and scientific research platform at all levels built by the college, students gradually solve these problems with the guidance and help of their teachers. In the process of solving these problems, students harvest various professional knowledge related to veterinary clinical diagnosis, exercise their professional skills and enhance their ability to analyze and solve problems in veterinary clinical diagnosis and treatment, and initially establish a teacher-led, student-oriented, application-oriented and innovative and parallel education model of integration of science and practice. Subsequently, the students formed a problem-solving process similar to the solutions provided by technical service personnel of livestock and poultry clinical diagnosis and treatment companies and carried out "company + customer" lectures in the classroom to assess the cutting-edge, rigor, and applicability of the final solutions to problems submitted by the students. The final score will be calculated according to different weights and used as the primary basis for the course evaluation.

3. Integrating the Teaching Content of "Veterinary Clinical Diagnosis" into 4 Major Topics, Teachers Carry out Special Lectures and Ask Applied Questions

To improve students' learning interest and reflect the foresight, application and interest of the lecture content of "Veterinary Clinical Diagnosis", the teaching content of "Veterinary Clinical Diagnosis" was integrated into 4 topics, which are shown in Table 1, based on the core competencies of the demand for livestock and poultry clinical diagnosis and prevention talents in the process of regional livestock and poultry industry development, combined with the advantages of our professional construction and discipline development. The lectures on these 4 topics focus on the basic knowledge of veterinary clinical diagnosis, improve the students' mastery of the basic theory and methods of veterinary clinical diagnosis, and also combine the frontier issues of livestock and poultry disease diagnosis and the latest clinical technology to cultivate the students' forward-looking vision and basic veterinary clinical diagnosis-related professional literacy. Through the special lecture the teacher, the study will pave the way for

Table 1. Integration of the teaching content of the thematic "Veterinary Clinical Diagnosis".

Chapter	Topic Name	Applied Problems	Credit Hours
1	Physical Diagnostic Methods	Question 1: How are common valve problems diagnosed in dogs and cats?	4 + 2
		Question 2: How is anemia diagnosed in dogs and cats?	4 + 2
2	Laboratory Diagnostic Methods	Question 1: How should bacterial diseases be diagnosed?	4 + 2
		Question 2: How to diagnose canine and feline diseases through blood tests?	4 + 2
3	Imaging Methods	Question 1: How to diagnose thoracic lesions in dogs and cats?	4 + 2
		Question 2: How to diagnose skeletal lesions in dogs and cats?	4 + 2
4	Clinical Treatment Techniques	Question 1: How to safely prevent and control infectious diarrhea in piglets?	4 + 2
		Question 2: How to treat blood transfusion in dogs and cats?	4 + 2

introducing the subsequent 8 problems related to veterinary clinical diagnosis with solid application to the students and lay the foundation for them to solve these problems subsequently.

4. Students form Teams to Solve Applied Problems and Develop Final Solutions with the Help of External Conditions

Students in each class form a team of about 8 students according to their interests and strengths to solve the problems raised by the teacher through various means outside of class. In the process of solving the problems, each member of the team does their job and works together. Based on the professional knowledge explained in the teacher's special lecture, they went to the library to check the relevant materials, combined with the Internet resources and various livestock and poultry clinical diagnosis-related database resources, proposed a set of feasible solutions, and then formed an initial set of solutions. Subsequently, with the help of the experimental teaching platform (clinical veterinary laboratory, preventive veterinary laboratory, animal basic science laboratory), scientific research platform (Dabie Mountain ecological livestock and poultry health production engineering research center in Henan Province, Henan Province waterfowl resources development and utilization and disease prevention and control engineering technology research center, Xinyang City livestock and poultry paramount epidemic disease prevention and control comprehensive technology research and development Laboratory, Xinyang City Livestock and Poultry Major Epidemic Disease Prevention and Control Integrated Technology Research and Development Laboratory, Xinyang City Animal Nutrition Metabolic and Poisoning Disease Engineering Technology Research Center, Xinyang City Livestock and Poultry Disease Prevention and Control Engineering Technology Research Center, Xinyang City Livestock and Poultry Breeding Environment Control Engineering Technology Research Center) and professional associations (breeding associations) to implement this set of solutions. In the process of problem-solving, when encountering difficulties that cannot be overcome by

themselves, students can seek help from the teacher in class with the use of network communication tools (WeChat group, QQ group, etc.), and the teacher will provide necessary guidance and assistance to the teams that have difficulties in problem-solving implementation. Each team continuously improves its solution in the problem-solving process and finally forms a perfect solution. The specific procedure is shown in Figure 2.

5. Students Will Conduct Lectures in Class on the Final Solution to the Problem, and Teachers Will Be Responsible for Assessment and Evaluation

To give full play to the leading position of students in the education and teaching process of "Veterinary Clinical Diagnosis", each team is required to organize the final solution of the applied problem into a thematic courseware and conduct a special lecture in the classroom according to the model of a company related to the diagnosis and control of livestock and poultry diseases carrying out technical service promotion to potential customers, with the team conducting the lecture simulating a representative of the company and other groups impersonating representatives of potential customers, and the teacher As the person in charge of the assessment and evaluation system, the teacher, conducts the course assessment and evaluation based on the rationality, completeness, and practicality of the solutions presented by each team and the effectiveness of the whole lecture and whether the lecture finally wins the satisfaction of potential customers, Excellent is 10 points, good is 8 points, qualified is 5 points. The specific assessment details and the weighting of each item are shown in Table 2, where the final grade of students = score of solution * 50% + score of lecture development * 35% + score of teamwork performance * 15%. It is worth mentioning that in the process of students carrying out special lectures, the assessment items are different. Each item involves a different assessment focus; the teacher responsible for the assessment should preferably be a special assessment team composed of professional teachers on campus, technical representatives of enterprises, and representatives engaged in human resource management to ensure that the whole assessment process is more scientific, rational, and fair.

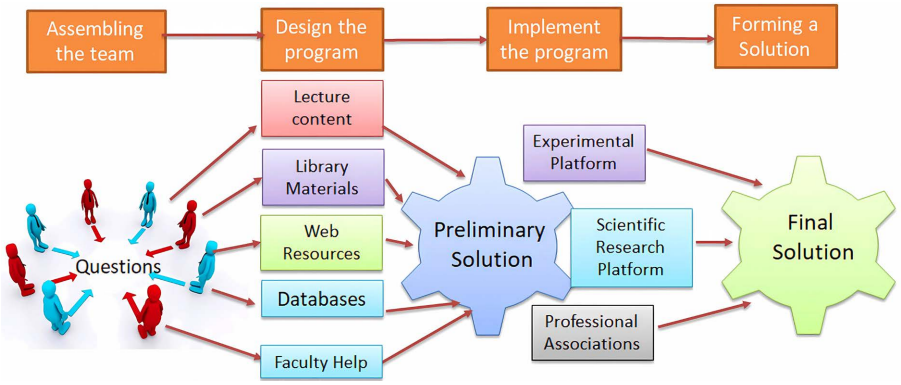

Figure 2. Application-based problem-solving process model diagram.

Table 2. Topic-based teaching assessment and evaluation system table.

Appraisal Project	Weighting	Evaluation Basis	Score Range (Points)
Final Solution	50%	1) Does it reflect the development trend of clinical diagnosis?	5 - 10
		2) Is the overall solution rigorous and reliable?	5 - 10
		3) Does it have scientific significance?	5 - 10
		4) Does it have innovative value or application value?	5 - 10
Thematic Lecture Development	35%	1) Is the lecture clear, fluent and vivid?	5 - 10
		2) Is the lecture focused and logical?	5 - 10
		3) Is the overall communication with the customer smooth?	5 - 10
		4) Have the two sides reached a cooperation agreement?	5 - 10
Appraisal Project	15%	1) Is the overall cooperation of the team good?	5 - 10
		2) Is the motivation of each team member mobilized?	5 - 10

6. Effect of Education and Teaching Reform

The author carried out the education and teaching reform experiment of "Veterinary Clinical Diagnosis" with the animal medicine students of 2019, 2020, 2021, and 2022 Xinyang Agriculture and Forestry College College of Animal Science and Technology classes, respectively, for five consecutive years since 2015. Half of the students (about 60) each year implemented the traditional teaching of the "Veterinary Clinical Diagnosis" course. This group of students served as the control group. Half of the students (about 60 students) implemented the service-ability-oriented thematic teaching of "Veterinary Clinical Diagnosis". The counselor teachers investigated the students' comprehensive performance during school and their employment status after graduation, and the specific results are shown in Table 3. As can be seen from Table 3, after the implementation of the teaching reform, the students' learning interest was significantly improved, as shown by the attendance rate of the experimental group was close to 100% and the average grade of students was significantly higher than that of the control group. The implementation of the service-ability-oriented thematic teaching of "Veterinary Clinical Diagnosis" has aroused students' concern about their future careers and strengthened their sense of identification with their profession, as shown by the fact that the number of students with clear career goals and the number of students who subsequently engaged in this profession was significantly higher than the control group. At the same time, in implementing the thematic teaching of "Veterinary Clinical Diagnosis", students' interest in exploring the field of veterinary disease diagnosis was stimulated in the process of solving problems with the help of practical teaching platforms at all levels of the college. Their desire to enter graduate school and continue their further study in the field of veterinary clinical diagnosis was induced, as shown by the significantly higher rate of graduate school in the experimental group than in the control group.

Table 3. Effect of teaching reform of thematic "Veterinary Clinical Diagnosis".

Grade	Group	Number of Students	Average Attendance (%)	Average Grade	Number of Clear Career Goals	Examination Rate (%)	Number of People Engaged in the Industry
Class of 2019	Control	60	95.2	81.2	5	35.4	20
	Experimental Group	60	98.0	85.4	15	45.6	25
Class of 2020	Control	62	96.1	82.4	6	34.6	19
	Experimental Group	63	100.0	88.6	20	43.8	26
Class of 2021	Control	64	95.3	83.2	8	36.8	18
	Experimental Group	61	100.0	88.5	35	49.2	25
Class of 2022	Control	63	95.6	83.6	8	35.7	17
	Experimental Group	62	100.0	90.5	42	48.6	28

In addition, during the implementation of the thematic "Veterinary Clinical Diagnosis" teaching process, some innovative and applied problem solutions have been generated, such as "How should bacterial diseases be diagnosed?" submitted by the third group of students in the experimental group of 2016. Due to its vital innovation, the solution was declared jointly by teachers and students as a scientific and technological research project in Henan Province. The related research was subsequently declared as 2 invention patents, 1 utility model patent, and 2 core journal papers were published. Again, for example, in the experimental group of students in the class of 2017, the fourth group of students submitted, "How to safely prevent and treat infectious diarrhea in piglets? Zhengzhou Baiyun Animal Pharmaceutical Co finally introduced the solution. The micro-ecological treatment for diarrhea developed using the principle of "treating bacteria with bacteria" has become the company's top product, generating good economic and social benefits.

7. Discussion

By carrying out the teaching reform of "Veterinary Clinical Diagnosis" with service capability as the guide, the teaching content, which is fragmented, boring, and abstract, is integrated into 4 topics with obvious application characteristics according to the core ability of veterinary clinical diagnosis talents demanded by the development of livestock and poultry breeding industry. The traditional "duck-filling" teaching method is transformed into a teaching method that is teacher-led (teachers' lectures) and student-led (students' problem-solving and studies). The traditional "fill-in" teaching method is changed into a teaching method led by teachers (teachers' lectures) and students as the main body (students' problem solving and lectures); the traditional experimental training teaching content is changed into 9 problems which are applied and exciting and closely related to the service of livestock and poultry breeding industry. The rigid and rigid paper examination centering on knowledge points is changed into an analysis based on the comprehensive application of knowledge, good division

of work in teams and joint efforts to complete tasks. The team examinations are based on the broad application of knowledge and the excellent division of labor to accomplish the tasks.

Through the reform of the above aspects, students' interest in learning is obviously enhanced, the leading role of teachers is reflected, the central position of students runs through the whole process of education and teaching, the assessment and evaluation mode is more scientific and reasonable, the ability that students exercise and cultivate in the process of problem-solving is more compatible with the core ability of veterinary clinical diagnosis industry for talents demand, and their ability to serve the regional livestock and poultry large-scale breeding industry is significantly improved. The ability to do the regional livestock and poultry large-scale breeding industry is enhanced considerably. In addition, many animal medicine students not only exercise and improve their communication and teamwork skills by participating in practical activities but also discover their strengths and talents and find their interests, which is very important for students' future career planning.

However, the implementation of this education and teaching reform has put forward high requirements on the theoretical and practical teaching team, assessment and evaluation team, students, and experimental training platform; if the relevant hardware and software conditions are not mature enough, it can be gradually promoted in the process of promotion, for example, first, choose to carry out in some chapters, and subsequently, as the hardware and software conditions are mature, then in the whole "Veterinary Clinical Diagnosis" course In the process of implementation, the teacher should pay attention to the fact that the system is not only a good example but also a good example. In the process of implementation, teachers should pay attention to grasping the degree of difficulty of application-oriented problems; students can complete them, combine them with the disciplinary characteristics and professional advantages of the college, connect with the industrial development foreword and other factors, and also consider whether the practical teaching platform of the school can meet the requirements of application-oriented tasks. Therefore, at the early stage of education and teaching reform, some relatively simple application problems can be proposed to enhance students' self-confidence and enthusiasm for participation. Later, with the professional construction and development of the college, with the continuous improvement of the software and hardware related to the course of "Veterinary Clinical Diagnosis", and with the constant improvement of the level of livestock and poultry large-scale breeding, the difficulty of the application problems and the degree of compatibility with the service industry can be appropriately enhanced. To improve the challenge and applicability of the course, and finally create a professional approach with prominent application characteristics, high student participation, and good teaching effect.

8. Conclusion

Through the teaching reform of Veterinary Clinical Diagnostics, the theoretical

teaching content is closely linked to the forefront of discipline development, and the practical teaching system characterized by the skill training of veterinary clinical diagnosis is constantly improved. On the basis of mastering the basic experimental operation skills, the students can further strengthen the comprehensive operation training of common and key veterinary clinical diagnosis, and effectively cultivate the students' ability to solve clinical problems. It effectively expands the students' knowledge and stimulates their logical thinking ability. At the same time, it organically connects scientific research with teaching, guides students to carry out scientific and technological innovation activities, and effectively cultivates students' innovative spirit and innovative ability. Of course, how to further optimize the teaching content of Veterinary Clinical Diagnostics, strengthen the practice training and meet the needs of current social development is the key content of the teaching reform of Veterinary Clinical Diagnostics in the future.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

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