

Application of "PAD Classroom" Teaching Mode in Professional Basic Courses and Its Research

Taking the Course of Phytobiology as an Example*

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Abstract—The professional basic course is the key to guarantee and improve the quality of college teaching. The learning stage of professional basic course is an important period for students' ability training. Therefore, the teaching reform of professional basic course is the focus of the college teaching reform. With the characteristics of the "PAD classroom" teaching mode, this paper takes the phytobiology course as an example to explore and study the feasibility of applying this teaching mode in the professional basic course. The goal is to propose a new approach to the teaching practice of "Phytobiology" course, and make active exploration in cultivating applied talents.

Keywords—"PAD classroom" teaching mode; professional basic course

I. INTRODUCTION

The professional basic course not only has the particularity of its subject, but also has strong foundation that is closely linked with the professional course. The mastery and application of the knowledge of the professional basic course directly affects the students' interest in learning and professional work ability. Professional basic courses are the key to ensuring and improving the quality of teaching in colleges and universities, and occupy a very important position in the university teaching. The establishment of professional basic courses is generally in the first and second grades of the university, and the subsequent professional courses are connected. The solid professional foundation is an important cornerstone of future development. The learning time of professional basic courses is an important period for the development of students' ability. It fully explores the potential of students, cultivates the ability to analyze and solve problems, cultivates the spirit of innovation and painstaking research, forms a scientific concept of thinking, and improves the overall quality of students. Therefore, in

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the exploration of college teaching reform, the teaching reform of professional basic courses is the focus of attention.

Phytobiology is a professional basic course for agriculture and forestry. The teaching of this course plays an important role in students' knowledge of plants. It is the necessary foundation for further study of important specialized courses in agriculture such as agricultural plant pathology, plant cultivation, weeds science and plant disease diagnosis, and also affects students' professional interests and innovative abilities. Combining with the characteristics of the "PAD classroom" teaching mode, this paper explores and studies the curriculum reform and practice of "phytobiology", and proposes a new approach to the teaching practice of "phytobiology", which effectively improves students' application ability of basic knowledge of phytobiology to professional practice. It has made active exploration and practice in application-oriented talent development.

II. PROBLEMS IN PROFESSIONAL BASIC COURSES

A. Professional Basic Course Covers a Lot of Content, and the Amount of Class Is Shortened

Phytobiology is a professional basic course formed on the basis of original botany. The content is complex and complicated. From microscopic to macroscopic, the content covers cell, tissue, organ structure and development, and plant system evolution, classification and physiology. However, in order to adapt to the transformation and development of local applied universities, the professional basic courses have been greatly reduced. In recent years, the theoretical classes and experimental practice time of phytobiology have been greatly reduced. We have always attached great importance to the teaching of phytobiology, however, the teaching effect has also declined. For the agronomy and plant protection professions with strong practice and application, this also reduces the students' learning requirements and interest.

B. Disconnection Between Professional Basic Courses and Follow-up Courses

The theoretical teaching contents of professional basic courses are rich, and are derived from some classic theoretical content or equations. The concepts in the phytobiology curriculum are rich, abstract, and difficult to understand and digest. Most of these courses adopt teacher-based teaching method (Zhou Xianhui, 2010). In the lecture-based classroom, teachers are often the main body, and students are basically in a passive position. In addition, students at this stage don't have access to the professional courses, and don't know enough about the majors. Therefore, they don't pay due attention and understanding to the professional basic courses. When students study this course, they only can have preliminary understanding. They have no interest in learning about the course. They cannot analyze the problem from a higher angle and do not really understand the purpose of learning. The students will passively participate in experimental practice activities, can't understand the key points and difficulties, or cannot

grasp the deeper meaning. And the students can't use what they have learned. This directly affects the learning and application of the follow-up professional courses, resulting in the disconnection.

C. The Ability to Use Knowledge and Solve Problems Is Low

Due to the small amount of class and the poor learning initiative of students, students' ability to use knowledge and hands-on practice is weak, which leads to the disconnection between basic knowledge learning and problem-solving ability. Analysis of problems and problem-solving ability are based on students' solid grasp of knowledge, memorization of certain concepts, natures or laws. Without the summary, they cannot fully understand and integrate knowledge, and will not flexibly use what they have learned in practical courses.

III. CHARACTERISTICS AND APPLICATION OF "PAD CLASSROOM" TEACHING MODE

The teaching mode of PAD classroom is a new classroom teaching mode proposed by Professor Zhang Xuexin of Fudan University according to the current situation of domestic university classrooms and based on the law of psychology. In view of the main problems existing in the current college classroom, combined with the advantages of the lecture-based classroom and the discussion-oriented classroom, the core idea is to allocate half of the classroom time for the teacher to teach, and the other half of the classroom time is for the students to discuss. It should stagger the lecture and discussion time. The students have a week to arrange learning independently, and have personalized assimilation, achieving "halving classroom". "PAD classroom" can be clearly divided into three stages of presentation, assimilation and discussion. This method combines the advantages of the traditional teaching method and the discussion-based classroom, emphasizing the teaching. That is, the teacher teaches first, and the students learn later. It is similar to the discussion-based classroom. "PAD" emphasizes student-student interaction and teacher-student interaction, and encourages independent learning. However, the key innovation of the "PAD classroom" is to stagger the lectures and discussions. The students have a certain amount of time to arrange their own learning and personalized assimilation. Students can have a think on the basis of mastering theoretical knowledge, which is to cultivate students' thinking ability and exploration and innovation spirit.

Before the idea of the "PAD classroom" was put forward, there were some similar practices of "teaching + discussion" at home and abroad. For example, Professor Wang Weihong (2003) of the School of Business of Guangdong University of Foreign Studies has proposed the "Project Teaching Method" for marketing majors. The essence is the reflection of the PAD classroom. The teaching mode popularized in the university is "Teaching + Display" (Yang Shuping et al., 2015). After the teacher teaches a chapter, a group of students collect relevant information on a specified or customized case with the theoretical knowledge learned in

this chapter, make the analysis and discussion and make PPT. The students will make the display in the whole class, and the time is about 15 to 20 minutes. This kind of display brings students different perspectives. It is relatively novel. This teaching model will drive other students to learn and think. However, it doesn't mean that all the students participate in the process. During this process, other students have passive listening. It belongs to the lecture-based model.

In the "PAD classroom", the lectures and discussions are staggered. The students have a certain amount of time to arrange their own learning, to carry out personalized assimilation, and to strengthen the learning results in the form of discussion and homework. It is the key innovation to "PAD classroom". In essence, it redistributes the rights and responsibilities in teaching. It gives students the rights they deserve, allows students to take responsibility, demonstrates respect for students, and creates a democracy, dialogue, open and free atmosphere, and makes the classroom harmonious, comfortable, fun and dynamic. The "PAD classroom" conforms to human nature, releases people's potential, publicizes individuality, fosters creation, and provides a new educational paradigm for innovative talents.

Professor Zhang Xuexin from the Department of Psychology of Fudan University had made a try of PAD classroom teaching mode during undergraduate teaching in 2014, which was welcomed by students. Subsequently, it was applied in thousands of courses in more than 200 schools, covering a wide range of subject fields such as humanities, science and engineering, and medicine. And it has gradually penetrated into the basic education field. The PAD teaching model even spread to Africa. In the teaching of Chinese as a foreign language, significant results have also been achieved, with nearly 100,000 students experiencing PAD classroom teaching. Du Yanfei and others believe that PAD classroom teaching model should be reasonably designed according to the teaching content, teacher experience and student characteristics. In the implementation process of "PAD classroom", flexible arrangements should be made according to the characteristics of students and the nature and content of the courses. We should not rule strict time on the teaching and discussion. Teachers can flexibly arrange the time ratio according to the content of the course and the performance of the students, and arrange the assignments reasonably. Yue Menglin and others studied the problem of teacher-student interaction under the PAD mode. It is believed that there is still room for improvement in the interaction between teachers and students, interactive tools, and interaction time. It is also the direction for teachers to make the exploration in the future.

IV. FEASIBILITY OF APPLYING "PAD CLASSROOM" TEACHING MODE IN PROFESSIONAL BASIC COURSES

A. Practical Plans of "PAD Classroom" Teaching Mode in the Professional Basic Course

Taking the phytobiology of plant protection in our school as an example, there are 64 hours of study. The class time is 16 weeks. The average class is once a week (2 hours), and the average two-week experimental practice class is 4 hours. The course content is divided into 8 modules. The first lesson is taught by teachers. The teacher explains the content framework, key points and difficulties of a certain module, and sets the scope and arrangement of the next discussion. In the second class, the students can have after-school digestion and absorption. Students read the contents of the textbooks, bibliography and literature to complete the homework. And the group conducts simple communication in the process to prepare for the discussion in the class. The second class is used for discussion and answering questions. In the first class, 5-6 people will have a discussion, share the learning experience and results, and answer each other's questions. The teachers will participate in the discussion and answer questions. In the second class, the teachers will review the key contents according to the students' completion, and ask questions about common problems, and summarize the content and key points of this module combining the latest industry trends, forms and follow-up professional courses. In the first experimental practice course, the students complete the content of the experimental practice course. And the relevant content can still be tested and evaluated in the process.

B. Practical Points of Application of "PAD Classroom" Teaching Mode in Professional Basic Courses

In the teaching stage, this teaching mode requires teachers to do a good overall design of the whole course, fully understand the content that needs to be transmitted to the students, outline the basic framework, the key points and difficulties that the students need to master in the classroom, and arrange the homework.

At the stage of digestion and absorption, students are given a certain amount of time to complete the content sorting and class assignments by fully reading textbooks and looking up materials. In this process, electronic information equipment and networks are used to establish a platform to provide communication and supervision.

The discussion was carried out after a sufficient period of student class. The group members exchanged the knowledge points, shared the learning results and formed new questions. Finally, the teacher answers questions or tests according to the student's learning situation.

C. The Significance of the Application of "PAD Classroom" Teaching Mode in Professional Basic Courses

1) *To get better teaching results in a shorter class time:* This teaching mode only requires the teacher to focus on the key points and difficulties in the classroom, the basic framework of the knowledge points, and solve the questions

raised by the students. The teacher's arrangement of the curriculum, the students' digestion and absorption of knowledge points and the discussion in the group can be carried out after class.

2) *To improve the overall quality of students:* Because of the characteristics of professional basic courses, teachers mainly give the lectures. Teachers need to use various methods to guide students to cooperate with each other happily. All the contents of the course are organized and presented by teachers. Students must cooperate with teachers from time to time. And the students should do everything according to the teacher's ideas. There is basically no real communication and interaction in the classroom, and students are in a passive position. In the PAD classroom, the teacher only needs to grasp the key points and leave other content to the students to learn. The process of digestion and absorption of the students helps to cultivate students' ability to learn independently. In the experimental practice course, in order to solve a problem, students need to actively participate in the construction of knowledge and knowledge application, which realizes the overall understanding of the curriculum knowledge, and helps students to summarize and develop critical thinking. At the same time, in the process of communication with classmates and teachers, students' ability to express and critical thinking can be improved.

3) *To improve the evaluation mechanism of the course:* The evaluation system is closely related to the teaching and teaching effects. In the form of assessment, according to the characteristics of the curriculum and the teaching content, diversified assessment methods are conducive to the development of students. The teachers should pay attention to the usual process assessment, and dilute the one-off theoretical examination at the end of the period (Liu Chaoya, etc. 2011). A final exam should not be the baton in teaching and learning. The teachers attach importance to the assessment of teaching process, mobilize students' enthusiasm for learning, comprehensively assess the learning situation of students' basic subjects, and understand the basic application ability of students' comprehensive course (Zhu Lilong et al., 2015). The implementation of PAD classroom can fully realize the evaluation of the process. Combined with the results of the evaluation, we can get more scientific, comprehensive and reasonable assessment of the comprehensive ability of students in the course. It effectively reflects the whole process of teaching and learning. To a certain extent, it cultivates the initiative and creativity of students.

4) *Be conducive to the growth of teachers:* PAD classroom teaching focuses on student-student interaction and teacher-student interaction. The students will learn each other, and communicate with each other. At the same time, the communication between students and teachers will increase. When the students have difficult problems and need teachers' answers, the teachers can see new insights of

the students. Also, the teachers can answer difficult questions and control the content of the classroom. This requires teachers to have higher overall quality and solid professional foundation. Thus, it will promote teachers to deepen their learning and broaden their knowledge.

V. CONCLUSION

The application of PAD classroom teaching method in the professional basic course fully embodies the student's status as the main body of learning, cultivates the students' good habits of active learning and extracurricular conscious reading of materials in class, and also alleviates the contradiction between the shortening of class time and the large amount of knowledge of the course. This exploration will effectively improve students' interest in learning and professional practice, and cultivate a new approach to curriculum teaching practice for applied talents.

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