2012 International Conference on Solid State Devices and Materials Science

Discussion on Reformation of Biotechnological Pharmacy Experimental Teaching

Zhang Wen, Li Yanjun, Zeng Qiao

Shaanxi University of Science and Technology, Xi’an, Shaanxi, China

Abstract

This article constructs a "comprehensive-designable-innovation" multi-level experimental teaching model, through integrating related disciplines courses, updating biopharmaceutical experiment teaching content, adding designing and innovation experiment item. During the teaching, the teacher mobilizes and stimulates the students' learning interest, enthusiasm and initiative fully by adopting the opening experiment teaching mode. The experiment not only consolidates the students' theory knowledge, makes them master the basic skills of biological pharmacy experiment, but also cultivates the students' independent innovating and independent ability.

Keywords: biological pharmacy, experimentation teaching, innovation

1. Introduction

Biological pharmaceutical experiment was a compulsory experiment for pharmaceutical engineering major students in Grade Four set up, and it was a important segment in professional practice teaching. Its purpose was to make students master the biotechnological experimental skills and improve themselves’ comprehensive ability and experimental quality. While most of the traditional experiment teaching content was full of validation but less innovation, full of qualitative but less quantitative, so students were almost disinterested in experiments, and they had no chance in choosing experimental materials and designing experiment. All this problems had seriously affected the students' experimental skill and innovation ability raising.

2. Total thinking

This issue guided with the Pharmaceutical Engineering Specialt’s cultivation target- "three drugs simultaneously" in our school, and the Ministry of education and "quality project" in our school which could strengthen the practice teaching, training students' practical ability and creative spirit of file spirit, combined with characteristics of biological pharmaceutical experimental and laboratory conditions, by updating the biological pharmaceutical experiment teaching content, integrating the related courses,
designed comprehensive experiment teaching content, added experiment projects which were innovative, conceived gradative experimental teaching mode-“Comprehensive construction - Design - Researching innovation”. This mode used the open experimental teaching mode which could mobilize and motivate the students' learning interest, enthusiasm and initiation fully. It could make student in the experiments not only consolidate the theory of knowledge, master the basic experiment of biological pharmacy skills, but also cultivate students’ ability of independent innovation and independent scientific research ability.

3. Reform contents

3.1 Reforming the gradative experimental teaching mode-“Complex - Design - Researching innovation”

According to the siting of the professional course and the demands of the talent training, we updated the contents of the experiment items, and determined the thought and planning of the experimental teaching. The experimental teaching was designed into three levels: the first level is major of the comprehensive experimental items. In these items, we fused various experimental teaching courses, the target is reforming students' knowledge structure ompletly and systematically and strengthening students’ skills in using various experimental masterily and comprehensively; second levels is major of designing experimental items. Students were required to design experiment program independently. This step emphasized the cultivation of students’ independent research ability and innovative quality; the third level is major of the scientific research and innovation experiment items. Teachers' scientific research projects and practical problems in production were designed into the experiment content. Students who were interested in Biological Pharmacy could be trained in higher levels in experimental skills, scientific research ability. These three levels could finally form the multi-leve experimental skill training mode with “Tampping foundation knowledge and skills – Forming comprehensive application ability - Expanding the quality of scientific research innovation”

3.2 Increasing the designing experimental items

Comprehensive experiment could combine more than one subject organically, the students could master more experimental operational skills. But in the processes, the students listened to the teacher’s lectures or laboratory demonstration, then done assigned experimental items and wrote test report according to experimental lecture. This approach made the students in a passive state. After completing the experiment, the study impression is not deep, so it was not conducive to cultivating students’ ability, especially the cultivation of innovation ability.

Designing experiment was a kind of new experimental teaching modes which appeared in experiment teaching reform in our country’s universities in recent years. Through adding the designing experiment items, we asked the students think, design, operate, summarize for themselves according to the specified task or request. In this processes, they were always in the exploring learning condation. So this could enhanced the students’ability of thinking and innovative.

As a engineering college, we always attached importance to practice teaching. In order to improve the effect of experiment teaching further, we tried to transform the biological pharmaceutical experiment from comprehensive teaching to designing teaching. Students were asked to think, design, operate, summarize for themselves according to the specified task or request. This could develop their ability of initiative learning, independent thinking and analyzing, independent solving problems, and improve their innovation ability.

3.3 Increasing the innovative research experimental items

During the processes of the experimental teaching, we added the teacher’s scientific research projects or achievements as well as the production of practical problems into specific program of scientific research innovation experiment project, for students who were interested in Biological Pharmacy. So that the biological pharmacy experiment although has ended, but the experimental opportunities, innovation consciousness and concept is still continues. Students consulted relevant information, wrote the opening
report, detailed experimental operation plan, arranged their own time to complete the experiment schedule, then obtained experimental results, wrote the experiment report, replied, published good results. Adding research innovation experiment, could not only make the new development, new technology of subject soon combine to classroom teaching, stimulate students' interest and desire for knowledge, but also promote the experimental project and content's updating, it is in favor of the formation of characteristic experimental teaching system. Also it could stimulate students' love of Biological Pharmacy, and was good for graduation design.

3.4 Let students participate in preparation work of the experiment lesson

In order to make the students get plenty of exercise in the limited time, we could arrange students to participate in preparation work under the guidance of teachers before preparations, such as reagent’s weighing, preparation, and standardization, equipment debugging and calibration. Participation in experimental preparations is helpful for the students’ ability in thinking actively and solving problematic.

3.5 Construction of open experimental teaching mode

One hand, because of the features such as long time and limited teaching hours, we could extend the opening hours of the laboratory. If only affecting the normal teaching situation, laboratory could be opened to students in a fixed period one week, and students could choose time to perform the experiments; on the other hand, all of the experimental equipment were also opened to the students. The students' creative spirit and practice ability could be cultured in the free space.

3.6 Examining methods of the innovative experimental teaching

Usually the course examination generally included a preview experiment report, experiment, experimental report, attendance, etc., but these didn’t fully show their ability of creative thinking. As to the designing experiments and scientific innovation experiments, we tried to let the student walked onto the stage, explain their ideas, processes and conclusion of the experimental design, then analysis. Also they needed to answer other students’ questions. This method greatly improved the students' interest in learning, trained students of solidarity, mutual help spirit. On the other hand, this method could provide the students chances to express their view. At the same time, it could also open the windows for teachers to understand students, make the experiment teaching to become true interactive teaching.

4. Ending

In short, through the implementation of the multi-level model practice teaching system which involved "integrating-designing-researching and innovating", we could transform the traditional analog experiment into the comprehensive and designing one. All these could cultivation students' innovation ability, studying interest and the desire passive of scientific exploration. Also, it used an new examination type which was integrated and comprehensive but not single and one-sided to cultivate students' learning spirit and rigorous scientific attitude towards study, this could let students study from the passive acceptance of knowledge into active uptake of knowledge. Also could let the students contact with scientific activities earlier, that could train students' independent ability to analyze and solve problems.

References