

The Construction and Implementation of Novel Innovative-Ability-Oriented Practice Teaching Model for Pharmacy Major

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Abstract: The system of education in China has always focused on cultivating students' practical and innovative abilities. Similarly, the training pattern of pharmaceutical talents should also be like this. However, the reform of our country's education and training model of pharmaceutical talents of undergraduate students has yet to be deepened. Based on the pattern of cultivating pharmaceutical talents in the school of Pharmacy, Jiangxi Science and Technology Normal University, we implemented a reformation and established one of novel innovative-ability-oriented practice teaching model for pharmacy major. Under the new teaching model, not only the students' score has significantly improved, but also improved their practical and innovative abilities.

1. Introduction

The development of the pharmaceutical industry is closely related to human health [1-3].

In recent years, the pharmaceutical industry has developed rapidly. However, there is an increasing shortage of high-quality pharmaceutical talents with practical and innovative abilities. With the pharmacy education continues to evolve, it is especially important to help a pharmacy student develop practical ability and innovative spirit [4].

We all know that the cultivation of pharmaceutical talents with practical and innovation abilities can meet the demand for talents of pharmaceutical companies [5]. Through the deepened cooperation between schools and enterprises, pharmaceutical enterprises can also train professional and technical personnel engaged in pharmaceutical production, improving the quality of management. Only in this way can provide sufficient talents for the development of pharmaceutical industry.

Many pharmacy schools in our country have a large number of pharmacy talents. However, like most of the developing countries, there are many problems in pharmaceutical talent training model in our country [6-10]. To solve these problems, we intend to improve pharmacy education through integrating theory and practice, especially pay attention to the cultivation of students' theoretical and practical innovation ability. The reform will conduct collaboratively with faculty and staff members, students, and stakeholders in pharmacy. Finally, we should make these reforms become a novel innovative-ability-oriented practice teaching model for pharmacy major. In this way, the new teaching model can cultivate more excellent students.

Here, in this paper, we introduced the new teaching model established by the College of Pharmacy, and the merit for the teaching model was discussed.

2. Methods

The research object is 80 undergraduate students of majoring in Pharmacy and Pharmaceutical Engineering from the school of pharmacy. All students are divided into 2 groups of 40 people each. One group adopted with new teaching model and the other group used the classical teaching model. This research method is mainly to investigate the practice and innovation ability of undergraduates.

Before we start this study, firstly, an investigation was carried out to the professional practice scores of past undergraduates from the Pharmaceutical College of Jiangxi University of Science and

Technology (Fig.1). The survey results provided a basis for the reform of the teaching model of the pharmaceutical college.

We did a survey about the professional internship scores of the past 162 graduated students of the School of Pharmacy, which were evaluated by the internship companies where the graduates are located.

From the Fig.1, we could see that most of the pass undergraduate students have professional internship scores between 80-70, and only 8.0% of the students get the scores between 100-90. In addition, there are still 16.0% of students get the score less than 70. According to the results of this survey, we know that the students have an issue of quality of employment competitiveness, and the classical teaching model is no longer applicable to students and needs to be reformed.

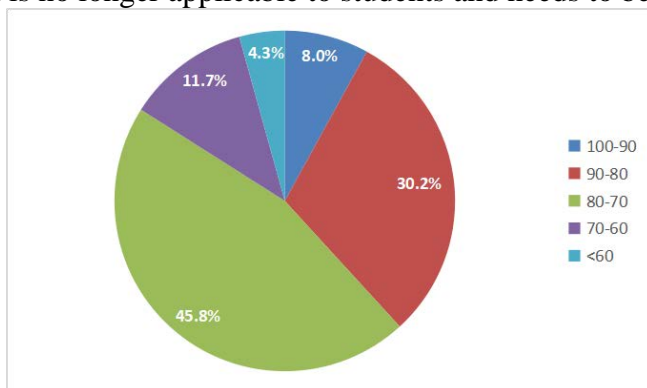


Fig.1. Statistics of professional internship scores of undergraduate students

Secondly, according to the results, we designed a reasonable plan for the reformation. The new reform plan pay attention to the role played by enterprises in cultivation of students' practical and innovative abilities, and increased the teaching evaluation system for students by corporate practice units, enterprises can also set up scholarship. At the same time, not only the school increased the ratio of comprehensive practical teaching hours, but also sit up a teaching platform for experimental skills training to improve students' practical operation ability. We carried out our plan in class in the School of Pharmacy of Jiangxi University of Science and Technology and several pharmaceutical companies in Nanchang of Jiangxi provinces.

Eighty undergraduate students majoring in pharmaceutical engineering and pharmacy in our school were selected as subject, respectively. And forty of them (named group one) was choose as the reference group using the classical teaching model as a control group. The other group (named group two) was choose as experiment group using the reformed method. And for different group, we select different way for this investigation.

Firstly, we change the classical teaching method. In classical teaching model, we taught the undergraduate students through the traditional method of "Theoretical Teaching + Graduation Practice" in group one, which called the "3+1" model in tradition. In generally, the first stage of "theoretical teaching" will cost 3 years, and the second stage of "graduation internship" will cost 1 year. While the group two, we established a new model of "3+1" of the teaching method. In the first stage of "theoretical teaching", we not only study the theory, but also set up the comprehensive experiments and the professional experiments in pharmacy to achieve the purpose of improving students' practical ability.

Secondly, we established the internship platforms of Jiangxi HuiRen Pharmaceutical and Zhejiang Jiuzhou Pharmaceutical as the "school-level demonstration practice teaching bases". Through school-enterprise cooperation training with two of the pharmaceutical companies, can make the pharmaceutical companies play an important role in the cultivation of pharmaceutical talents. In addition, pharmaceutical companies can set up the scholarships for the outstanding undergraduates.

Thirdly, in group two, we have established a rigorous evaluation system for students' graduation internship results and graduation thesis defense, called the "school-enterprise joint" model. The

company not only evaluates the students' internship performance, but also participates in the defense of the students' graduation thesis.

Finally, mid-examination and finally-examination were carried out in group two. Beside the professional knowledge in the examinations, you have to answer the following questions: questions: 1 what have you learned from this stage of study? 2. How do you think the study of this course will help you in your future work? 3. What else do you think you need to learn? And the scores in one of the important aspects for finally scores.

What's more, all the reformations were listed in the Table 1

3. Evaluation Methods

Evaluation methods include the ability of innovation, the ability of practical and others. The maximum mark is 100. Detailed evaluation system table in the following Table 2.

4. Results

After four years later, the novel innovative-ability-oriented practice teaching model for pharmacy major was applied in school of pharmacy, Jiangxi science and Technology normal university. Compared with the classical teaching model, the new teaching model is more effective and welcome to students. In addition, the final score consists of two parts, the school evaluation and the pharmaceutical company evaluation.

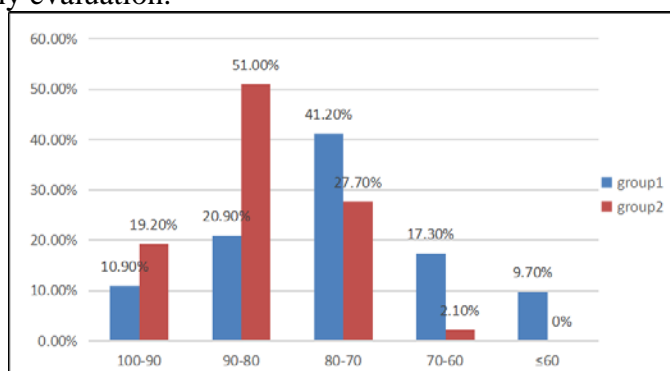


Fig.2. Statistics of finally scores of the two groups

From the Fig.2, we could see that the scores of the undergraduate students in group two are much better than the group one. What's more, in the date of group2, more than half of the students get the scores between 90-80 and none of student's score is below 60.

Table 1 differences between group one and group two in this project

Groups	Group one	Group two
Major	Pharmacy	Pharmaceutical Engineering
Undergraduate student numbers	40	40
Methods	Classical teaching system	New teaching system
The mode of teaching	The "3+1" mode in tradition: Theoretical Teaching + Graduation Practice.	A new "3+1" mode of teaching system: Theoretical Teaching+Comprehensive Experiments Professional Experiments+Graduation Practice.
Scholarship	Not established	Pharmaceutical companies set up scholarships for the outstanding undergraduates.
Evaluation system	Teacher evaluates students	The mutual evaluation of teachers and students+enterprise evaluation
Mid-examination	No mid-examination	Taking mid-examination(Include 3 questions), and the score is one of the important aspect for finally scores
Finally examination	Check table	Not only need check table, but also need be evaluated by the teacher

Table 2 Undergrate student practice and innovation ability evaluation system

A level of indicators	Secondary indicators
The ability of practical (C _p , 40%)	1. Basic experimental operations (20%)
	2. Professional experimental operation (40%)
	3. Professional internship (40%)
The ability of innovation (C _i , 40%)	4. Academic conference report (30%)
	5. Research proposal (40%)
	6. Examination achievement (30%)
Others (C _o , 20%)	7. Experimental program (50%)
	8. Question satisfaction (50%)

NOTE: Personal Composite Score (C_c) = C_p *40%+ C_i *40%+ C_o *20%; The ability of practical score (C_p) =C₁*20%+C₂*40%+C₃*40%; The ability of innovation score (C_i) =C₄*30%+C₅*40+C₆*30%; Others score (C_o) =C₇*50%+C₈*50%.

While in the group 1, the undergraduate students get the scores less than 60 are 9.7% and only 31.8% of the student get the scores of 80 or above. The result told us that the undergraduate students in group two can do better than the group one, which using the new teaching model.

From the Fig.3, it is noteworthy that, in the evaluation of the ability of practical, the group2 has 10 students in the overall score between 100-90. However, only 4 students in the group1 reached the level of 100-90. In addition, in terms of practical ability, there are 29 students achieved a grade of 80 or above in group2, accounting for 72.5% of the total. This ratio is nearly 50% higher than the group1.

What's more, in the evaluation of the ability of innovation, we can easily find that more than half of the students' score in group2 reached a grade of 80 or above and only one of the student's score get less than 60. Comparing with the group1, the group2 has an obviously advantage.

To sum up, through the analysis of the date, we can find that the scores of students receiving the new teaching model are really higher than the scores of students receiving the classical teaching model, especially in the practical and innovative abilities, the new teaching model is much better than the classical teaching model.

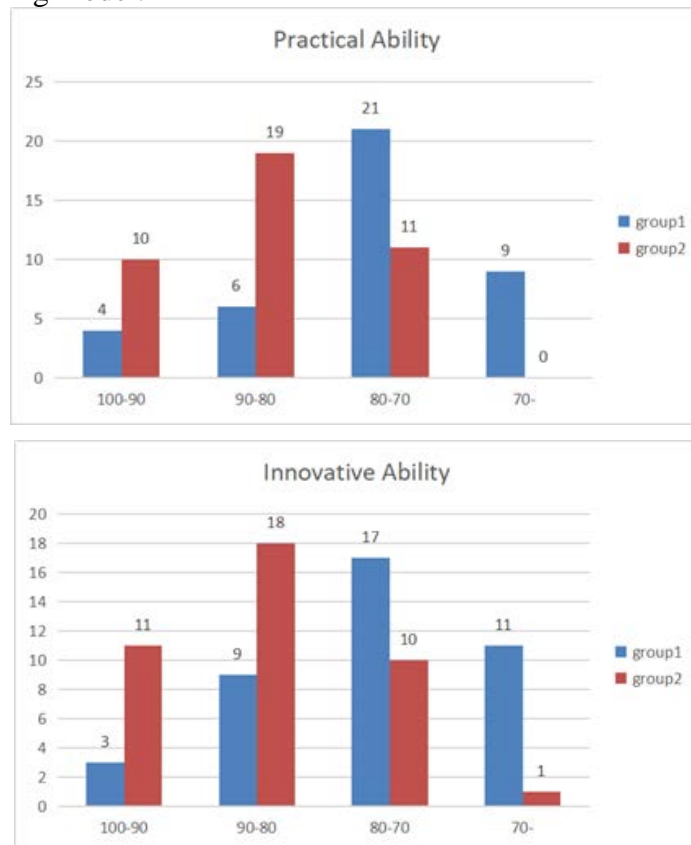


Fig.3. Individual practice and innovation ability comprehensive score distribution

5. Conclusion

In this paper, through the research of the cultivation of practical and innovative ability of undergraduates of pharmacy, we have made a change of the classical pharmacy teaching model. It not only improved the scores of the students, but also improved the student's ability to use the theoretical knowledge to solve the practical problems, which is beneficial for their future employment.

Finally, a further study of this new teaching model will be carried out in the near future, and we hope that the reformation of the teaching method will benefit to more and more undergraduate students.

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