Construction and Application of New Teaching Mode of Pharmacy Major to Improve the Students' Ability of Practice and Innovation

Wufu Zhu*, Jingjing Li, Jie He, Shan Xu, Pengwu Zheng

School of Pharmacy, Jiangxi Science & Technology Normal University, Nanchang, China

*zhuwufu-1122@163.com

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Abstract: Comprehensive application talents, high-quality talents, are widely needed by society. In order to better adapt to the development of society and meet the needs of pharmaceutical enterprises, we further reformed and explored the teaching mode in Pharmacy of Jiangxi Science and Technology Normal University on the current basis. At the same time, we reformed the teaching mode so as to give full play to the resource advantages of cultivating applied talents in universities. We took the undergraduates of pharmacy, pharmaceutics and pharmaceutical engineering as the research objects, and we carried out experimental research on traditional teaching methods and two new teaching methods respectively. The results showed that after the education reform, the students who adopted the "3+1" teaching mode of the "dual tutor" system had higher activity degree and stronger practical ability and innovation ability.

1. Introduction

In recent years, with the rapid development of science and technology, pharmaceutical education research has greatly promoted the progress and development of health care [1].

The fast-developing pharmaceutical industry is closely related to human health. It has the characteristics of high technology and high investment, which has gradually increased the requirements and needs for talents. However, there is a lack of close relationship between the talent training system and the industry. Meanwhile， the students' practical ability is weak. Therefore, there is an increasing shortage of high-quality talents with practical and innovative capabilities. At present, the teaching methods of Chinese universities are still in the traditional mode, and most of them adopt methods such as "cramming", "filling the house", "reading courseware" and so on. This teaching mode will make it difficult for students to really grasp the essence of the subject's knowledge and understand the future development of the subject [2-3].

The cooperation between schools and enterprises and work-study combination are the classical features of vocational education. It is necessary to have a well combination of classroom teaching and practical work by utilizing the resources of schools and enterprises. By highly integrating two of the different educational resources and educational environments of schools and enterprises, students can learn all the necessary knowledge and abilities in a real enterprise environment. It will also lead to a model of application-oriented talent training model, which links to the students' professional skills to future corporate jobs. We must change the way we think as soon as possible. After that, more and more innovative thinking is introduced into the daily teaching and the innovative education model is implemented. These practices can stimulate the students' creative thinking and make the innovative ideas popular in students. It will lay a good foundation for the future work and train more and better talents for the country to adapt to the new situation.

2. Methods

This new system used methods of comparative analysis, market research and analysis [4-8]. The selected research objects were 45 undergraduates who majored in pharmacy, pharmaceutical preparations, and pharmaceutical engineering from the School of Pharmacy. All students were

divided into three groups according to their majors, each group with 45 people. One group adopted the traditional teaching mode, the other group adopted the first reformed teaching mode, and the third group adopted the second reformed teaching mode. This research method mainly examined students' practical ability and innovation ability. Before the start of this research, we first conducted a survey of the final grades and previous results of internships in the pharmacy schools of most universities. The survey results laid the foundation for the reform of the teaching mode of the School of Pharmacy of Jiangxi Science and Technology Normal University.

Forty-five people in pharmacy (named the first group) were selected as the reference group, and the classic teaching model was used as the reference group. Forty-five people in pharmaceutics (named the second group) were selected as the experimental group Ⅰ and the first improved method was used. Forty-five people majoring in pharmaceutical engineering (named the third group) were selected as experimental group Ⅱ, and the second improved method was adopted. We choose different survey methods for different groups. First of all, we had changed all the traditional method of all teaching which made by teachers. In the classical teaching mode, the first group students adopted the traditional teaching mode of "theoretical teaching + graduation practice", that is, the traditional "3+1" teaching mode. Generally speaking, in the second group, we established a teaching model of "3.5+0.5". The "theoretical teaching" in the first stage was 3.5 years and the "graduation practice" in the second stage was half a year. In the first stage of "theoretical teaching", we not only changed the way that teaching theoretical knowledge by teachers to teaching by students', but also set up pharmaceutical comprehensive experiments and professional experiments to improve students' practical ability. In the third group, we adopted the "3+1" teaching model. The "theoretical teaching" in the first stage was three years and the "graduation practice" in the second stage was one year, which increased the time and proportion of practical teaching and highlights the cultivation of practical innovation ability. In addition, the model of “theoretical teaching” was the same as the second group. The students in the second group and the third group were responsible for two mentors, namely, on-campus mentors and out-of-school mentors. The mentors on-campus are held by professional teachers with practical engineering experience in the college, who are responsible for grasping the quality of the thesis and defense. The out-of-school mentor is served by the engineering and technical personnel of the cooperative enterprise, who is responsible for the teaching of enterprise courses and thesis guidance.

Secondly, a practical teaching evaluation system of "school-enterprise cooperation" has been constructed. In the first stage of theoretical study, the theoretical course was evaluated by examination, and the experimental part is divided into two parts: written test and operation. The operation part is field operation in the class and random sampling experiment at the end of semester. In the second stage, the graduation practice is to evaluate the students' practice through the defense of the graduation thesis, and the final score is determined by the school and the internship company. Finally, awards have been established for outstanding graduates.

Table 1. Differences among three groups in teaching methods

Groups	Group one	Group two	Group three
Major	Pharmacy	Pharmaceutics	Pharmaceutical Engineering
Undergraduate student numbers	45	45	45
Methods	Classical teaching mode	New teaching mode I	New teaching mode II
The mode of teaching	The "3+1" mode in tradition:	A new "3.5+0.5" mode of teaching system	A new "3+1" mode of teaching system

3. Evaluation methods

The final grade was taken as the evaluation standard of theoretical teaching reform, and the

students' activity was investigated, including classroom participation, average attendance rate, homework completion rate and number of discussions with teachers and notice inspection rate. The specific proportion of each part was listed in Fig.1.

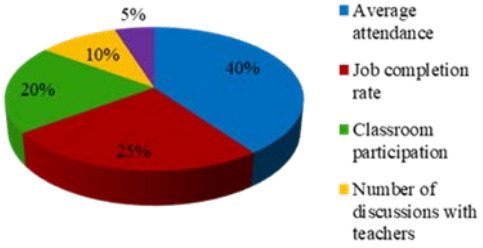

Fig. 1. Evaluation system of activity degree of undergraduate graduation

We also need to evaluate the students' practical innovation ability. The evaluation criteria include the usual experimental operation, examination experimental operation, experimental design and the writing of the experimental record book. The detailed evaluation criteria are shown in Fig.2.

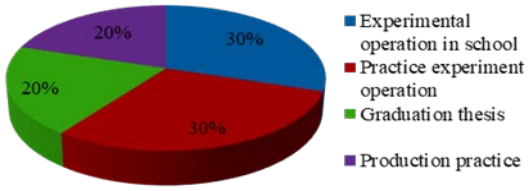

Fig. 2. Evaluation system of practical Innovation ability of undergraduate students

4. Results

It has been four years since the construction and practice of new practical teaching model of Pharmacy Specialty based on the cultivation of practical innovation ability has been applied in the school of pharmacy of Jiangxi Normal University of science and technology. We can clearly see that the students' test scores have been improved significantly. According to the experimental results, it can be found that the "3+1" teaching method of the "dual tutor" system is more conducive to improve students' practical ability and innovative ability, and the degree of students activity is higher than that of traditional teaching methods.

As can be seen from Fig.3, the score of the second group is much better than that of the first group. 58.7% of the students in the second group scored more than 80 points, while the proportion of students in the third group who scored more than 80 points was even higher, accounting for 73.6%. In contrast, only 30.9% of the students in the first group scored more than 80 points. At the same time, we can also see that 7.6% of the students in the first group failed, while none of the students in the other two groups scored less than 60 points. This result shows that this kind of new teaching reform has a certain effect, and the third kind of teaching reform has the best effect.

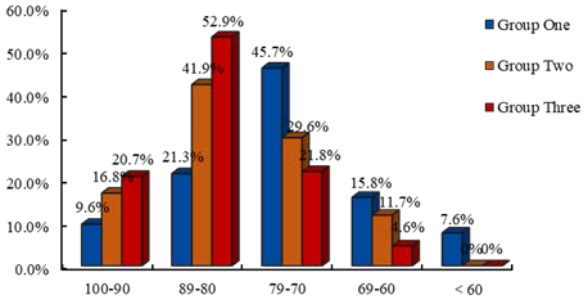

Fig. 3. Statistics on the final scores of three groups of theory courses

As is shown in Fig.4, after the teaching reform, Students' activity has improved significantly, especially in the number of classroom participation and discussions with teachers. Under the traditional teaching model, the number of attendants is only 35. While the teaching reform was carried out, it had more than 40 people, and the homework completion rate and notification inspection rate reached 100% in the third group.

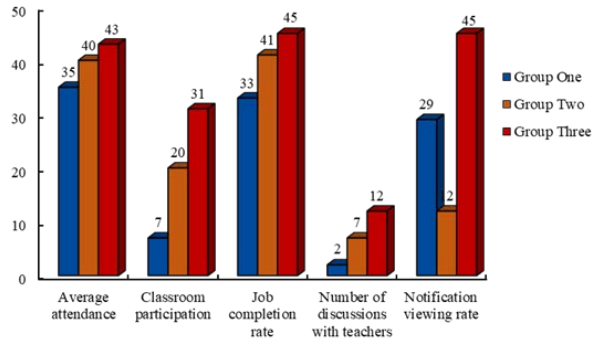

Fig. 4 Statistics of the number of people in each part of the three groups of activity

It can be seen from Fig.5 that the scores of the students in the first group are mainly between 70 and 79. However, after the teaching reform, most students' scores can reach above 80, while none of the third group scored below 70. The results show that this teaching reform is conducive to improving students' practical and innovative ability, and it is a relatively successful reform plan.

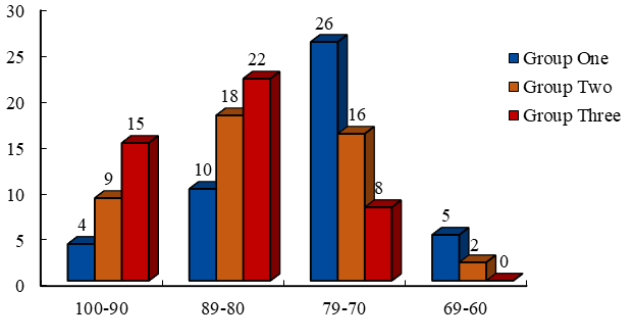

Fig. 5. Statistics on the scores of practical and Innovation of undergraduates

5. Conclusions

In this article, we discussed the change of practical teaching content and the comparison of the time of practice with traditional teaching. The results show that the establishment of "3+1" teaching model, three years' novel theoretical teaching + one year's graduation Practice, is more conducive to the training of applied talents in schools, and establishing an experimental course in it will help improve students' practical ability and integrate theory with practice. On the other hand, the setting of graduation internship helps to combine experiment with employment, and provides a guarantee for students' employment direction after graduation. majors or that like the experimental major. We will conduct further research on this new teaching model in near future and hope that the reform of this teaching method will benefit more and more undergraduates.

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