

Teaching reform practice of pharmaceutical chemistry based on professional certification

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Abstract: starting with the core concept of “student-centered and output oriented” professional certification, the course of pharmaceutical chemistry was implemented. Closed loop teaching, optimize the teaching mode and knowledge content, and construct the curriculum system and training mode of pharmaceutical talents training. Through the closed-loop teaching reform, taking students as the main body, aims to improve students’ learning motivation and stimulate students’ thirst for knowledge. Compared with the traditional teaching mode, the closed-loop teaching of medicinal chemistry has achieved good results in the aspects of students’ classroom participation, final examination scores and the cultivation of innovation consciousness. The closed-loop teaching mode is of great significance for improving the teaching quality of pharmaceutical chemistry and cultivating innovative R & D talents.

Key words: Pharmaceutical Chemistry; Professional certification; Teaching reform

As an important way to assess the school running level of related majors, professional certification is an important measure to ensure the quality of talent training. Pharmaceutical professional certification can improve the quality of personnel training in Higher Pharmaceutical Education in China. It is an important measure to condense school characteristics, deepen teaching reform, pool the strength of teachers and students, and promote the high-quality development of the school. The implementation of pharmaceutical professional certification is conducive to further improve the quality of pharmaceutical education, which is of great significance to improve the quality of personnel training.

Pharmaceutical chemistry, as a comprehensive discipline, is one of the main courses for pharmaceutical professional certification. Due to the comprehensiveness of the course, teachers are required to constantly enrich and update the teaching content in the teaching process, so as to broaden students’ vision and enable students to master systematic theoretical knowledge. At the same time, this course also pays attention to the cultivation of students’ innovative thinking ability and enhances their scientific quality, so as to achieve the teaching goal of cultivating students’ application and practice ability, innovative consciousness and scientific thinking ability.

Closed loop teaching is to form a complete closed loop through a series of teaching design and technical means, which has achieved the controllable teaching process and good teaching effect. Carry out closed-loop teaching reform in the course of medicinal chemistry, including task release, pre class preview, classroom learning, after class analysis, result evaluation, and plan adjustment. The teaching reform of medicinal chemistry aims to build a standardized and systematic pharmaceutical talent training mechanism with the concept of continuous improvement of education and teaching, aiming to cultivate applied pharmaceutical talents with excellent practical ability.

1. Disadvantages of traditional teaching and examination mode of medicinal chemistry

1.1 students’ learning process is passive and the teaching mode is single

In the traditional classroom teaching of medicinal chemistry, teachers mostly adopt the “cramming” teaching mode, and the teaching method is relatively single. Due to the theoretical difficulty and strong practicality of the course content of medicinal chemistry, there are certain difficulties in both teachers’ teaching and students’ learning process. Students passively accept knowledge and are difficult to integrate knowledge. For a long time, it not only greatly reduces students’ interest in the course of medicinal chemistry, but also has a serious impact on the subsequent study of related disciplines, which is not conducive to the cultivation of students’ comprehensive quality.

1.2 Unable to fully grasp the learning effect of students, and the assessment method is single

The traditional teaching assessment is mainly based on the examination results, and usually consists of two parts, including the usual results and the final examination results. There is no scientific and perfect evaluation system, which is more inclined to the evaluation of classroom knowledge, and the evaluation of students’ practical ability and comprehensive quality is weakened. This assessment method makes most students memorize key knowledge by rote, neglecting the understanding and application of knowledge, making teachers more unable to accurately evaluate the overall level of students, more unable to play the guiding and monitoring role of assessment in teaching, and even making students’ learning goals deviate.

Therefore, in order to change the traditional classroom teacher centered teaching mode, on the basis of the traditional mode, carry out the closed-loop teaching mode reform, optimize the teaching content and teaching methods, so that students can achieve the best effect of academic exchange while accelerating the absorption of knowledge, and truly achieve the educational purpose of “teaching and learning grow together and learn something”.

2. Teaching reform of pharmaceutical chemistry from the perspective of professional certification

2.1 course objective setting

Based on the requirements of professional certification for the cultivation of pharmaceutical talents in terms of Ideological and political, professional quality, knowledge structure, learning skills, innovation and entrepreneurship awareness, we are committed to cultivating applied technical talents with practical ability and innovative spirit and with comprehensive development of morality, intelligence, physique and beauty. The course of medicinal chemistry adheres to the teaching philosophy of moral education and five education. Based on this, the course has five objectives:

(1) Be familiar with the chemical structure and physical and chemical properties of drugs through learning the theories and methods of chemistry and pharmacy.

(2) Master the change law of physical and chemical properties of commonly used drugs and the principle of drug synthesis.

(3) By studying pharmaceutical chemistry, we can provide scientific and reasonable methods and processes for the production of chemical drugs, provide corresponding support for the accurate application of existing drugs, and lay a certain foundation for subsequent students to participate in the research and development of new drugs.

(4) Be familiar with the status and importance of pharmaceutical chemistry in pharmaceutical engineering, and understand the progress of new theories and applications.

(5) Establish a correct world outlook, lofty professionalism and a scientific attitude of seeking truth from facts.

The five course objectives of pharmaceutical chemistry correspond to five graduation requirements, as shown in Table 1.

Table 1 correspondence between course objectives and graduation requirements

Graduation requirements	Index point	Course objectives
Graduation requirements 1	(1) Chemistry knowledge and ability.	Course objective 1
	(2) Basic medical knowledge and ability.	
Graduation requirements 2	(1) Structure, production and preparation of medicinal chemistry	Course objective 2
	(2) Clinical application and management of drugs	Course objective 3
	(3) Physicochemical properties and metabolism of drugs	
	(4) Structure activity relationship of drugs	
Graduation requirements 3	(1) Basic method ability to obtain relevant information	Course objective 4
	(2) Ability to read and translate professional literature	
Graduation requirements 4	(1) Familiar with the basic knowledge of clinical medication	Course objective 2 Course objective 3
Graduation requirements 5	(1) Scientific attitude of seeking truth from facts	Course objective 5
	(2) Compliance with professional ethics	

2.2 construction of Pharmaceutical Chemistry Course

The early stage of pharmaceutical chemistry course is based on the courses of organic chemistry, pharmacology, cell and molecular biology, which provides a scientific and reasonable method for subsequent drug design, lays a certain foundation for new drug research, and plays a connecting role. Through case teaching, mixed teaching and other teaching methods, we can effectively integrate fresh social topics with curriculum knowledge, implement the "student-centered" talent training mode, complete the curriculum objectives, strengthen students' critical thinking and in-depth thinking ability, improve students' social practice ability and job competency, and cultivate applied pharmaceutical talents who meet the diversified needs of the society.

3. closed loop Pharmaceutical Chemistry Curriculum reform and Practice

3.1 implementation of closed-loop teaching mode

The closed-loop teaching reform in pharmaceutical chemistry course mainly includes 6 teaching links, as shown in Figure 1.

(1) Pre class Preview: release pre class learning tasks, and students can carry out personalized learning according to the corresponding learning tasks and their own reality. Preview materials include teaching courseware, exercises on the wisdom tree, etc. According to the feedback of the completion of students' tasks in the early stage, teachers understand and grasp the deficiencies and deficiencies of students' key knowledge points, and pay attention to the key teaching of students' lack of knowledge when preparing lessons.

(2) Classroom learning: after the teacher introduces the course, the students begin to discuss the relevant topics of the course, learn new knowledge and supplement the difficult problems in the early stage. The course of medicinal chemistry focuses on understanding and application, and mastering the origin, chemical characteristics, derivatives and structure-activity relationship of drugs. In the process of teaching, teachers carry out in class tests by combining pre class questions and ideological and political cases for targeted supplement and discussion.

(3) After class analysis: collect students' learning situation in this class, carry out personalized after-class learning, put forward questions in the form of homework, guide students to analyze, summarize the answers to the questions, remedy the problems found in time, and start the plan adjustment link to sort out the release of learning tasks in the next cycle.

3.2 curriculum assessment reform of closed-loop teaching mode

Taking the final learning achievement as the starting point, the assessment content is designed around the professional certification requirements and the teaching objectives of the course, and the weight of each assessment content is determined. Through the assessment results, the deficiencies of the assessment content are found out and improved. After evaluation and adjustment, relatively mature assessment contents are obtained, as shown in Figure 2.

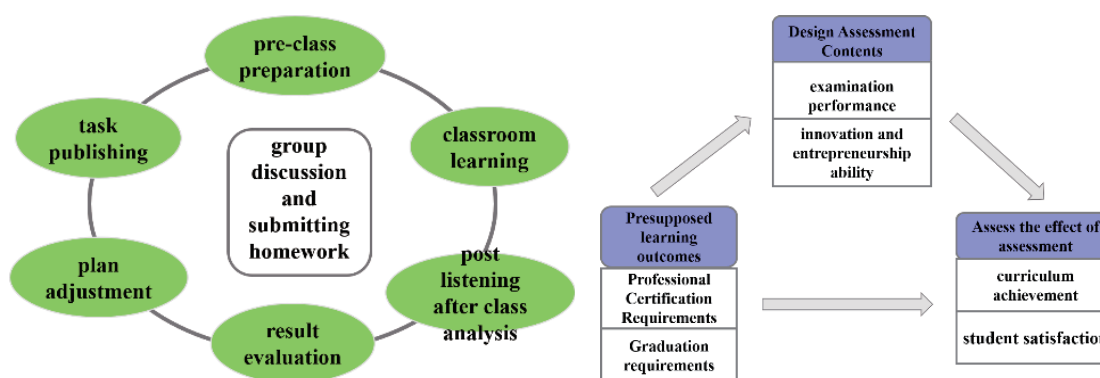


Fig. 1 closed loop teaching mode of pharmaceutical chemistry Figure 2 closed loop teaching assessment mode

The assessment results of pharmaceutical chemistry course are composed of pre class assessment results, process assessment results, group discussion results and final examination results. Pre class assessment results accounted for 15% of the total score, mainly focusing on students' MOOC registration and learning, analysis and test of learning situation on the smart tree platform; The process assessment score accounts for 15% of the total score, mainly including daily work, extension knowledge development, etc; Group discussion accounted for 10% of the total score, mainly including the production of PPT, presentation, etc; The final exam score accounts for 60% of the total score, mainly examining the basic concepts of medicinal chemistry, principles of drug synthesis, structure-activity relationship and thinking questions. The implementation of curriculum assessment in all aspects of curriculum learning is intended to improve students' motivation of active learning and cultivate students' ability of academic research.

3.3 teaching effect of closed-loop teaching mode

(1) Comparison of students' examination scores: the offline final examination scores of closed-loop teaching and conventional teaching parallel classes are compared. The average score of closed-loop teaching class is higher than that of conventional teaching parallel control class, of which, 100-85 scores account for 54.8%, 85-70 scores account for 35.5%, and 70-60 scores account for 9.7%.

(2) Teaching effect comparison: in order to evaluate the teaching effect of the closed-loop teaching mode, the teaching effect of the closed-loop teaching class and the conventional teaching class will be evaluated and compared. The evaluation results show that the scores of the closed-loop teaching class are higher than those of the conventional teaching class.

(3) Comparison of satisfaction with teaching methods: Students' evaluation of the course mainly includes comprehensive evaluation, teacher guidance, online communication, platform experience and other aspects, which is set as the 10 point evaluation standard. Among them, more than half of the students gave full marks. It shows that the closed-loop teaching mode reform of pharmaceutical chemistry has been widely recognized and highly praised by students.

3. Conclusion

The closed-loop teaching mode reform of pharmaceutical chemistry course based on professional certification takes students as the main body and implements the course assessment to all links of the course learning, which greatly improves the initiative and enthusiasm of students' learning; At the same time, the use of modern teaching methods has significantly improved the teaching quality of pharmaceutical chemistry; The established assessment mode not only tests the theoretical knowledge of the course of medicinal chemistry, but also

cultivates the students' ability to think independently, practice, analyze and solve problems. The reform of closed-loop teaching mode of pharmaceutical chemistry has important practical significance for further improving the certification system of pharmaceutical specialty in China and ensuring and improving the quality of pharmaceutical education.

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