

# *The Practice of "Problem-Based" Teaching Method in the Development of Research and Innovation Ability of Postgraduate*

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**Abstract:** The "problem-based" teaching method is based on the problems existing in the students. It is a teaching method that guides students to explore or learn knowledge independently and actively. Graduate students are the main body of learning with certain research purposes, so the teaching mode of problem-oriented teaching method especially needs to be strengthened. "problem-based" teaching method can enable students to better play their own strengths, pay attention to students' personal innovative thinking, cultivate their practical ability and strengthen their subjective initiative of study and inquiry. This article mainly introduces the differences between problem-based teaching method and traditional teaching method. Focusing on problem-oriented teaching method in research and innovation is reflected in the ability of students, with a view to providing after-related research and reference information.

## **1. Introduction**

Problem-based teaching is also a model called problem-based learning, which was first used in the field of medical education [1]. The problem-oriented teaching method, which is based on the questions raised by students or the problems that students have at the starting point of education, is a learner-centered educational viewpoint. Through the interaction between teachers and students, the initiative and enthusiasm of students' learning are increased, and the basis of interaction and cooperation between teachers and students is improved. In the teaching process, the problem-oriented teaching method does not turn students' learning into a single, passive process of receiving knowledge, but guides students to actively discover, analyze and deal with the problems, while making students feel the fun of learning [2]. As Graduate students are the main body of learning with certain research purposes, we especially need to strengthen the application of problem-oriented teaching methods.

## **2. The Difference between Problem-Based Teaching Method and Traditional Teaching Method**

Education is not only about getting students to learn, but also about making them know how to

learn. Directly giving students knowledge is not as good as handing them the key to open the door of knowledge. Traditional postgraduate teaching in my country is usually characterized by skill training instead of ability cultivation, with the participation of only a small number of students. The lack of teachers' in-depth analysis of the students' thinking direction has resulted in the phenomenon that students' knowledge blind spots can rarely be filled, resulting in the poor self-summary ability of most students [3]. Problem-oriented teaching method emphasizes that graduate students should be the main body of knowledge, development and practice in learning activities. Teachers should take postgraduates as the main body in the classroom, determine the central position of postgraduates in classroom education, guide postgraduates to actively participate in educational activities, and mobilize the initiative of each postgraduate, so that the learning mode of postgraduates can change from passive acceptance of knowledge to autonomous exploration of knowledge under the guidance of teachers. The differences between the problem-based teaching method and the traditional teaching method have been shown in Table 1.

Table 1: The differences between problem-based teaching method and traditional teaching method

<b>Differences in teaching methods</b>	<b>problem-based teaching</b>	<b>traditional teaching</b>
Targeted educational object	for all students	For a minority of students, ignoring the majority
learning method	student active learning	students forced to study
study method	Heuristic, guided, inquiry-based teaching	rote, mechanical repetition
skills development	Emphasis on the development of various skills	Only focus on skills training, ignore skills training
educational purpose	Cultivate students to develop in all aspects of morality, intelligence, body, beauty and labor	Pay attention to the imparting of knowledge and ignore the development of morality, intelligence, body, beauty and labor

As can be seen from the above table, the problem-based teaching method has the following advantages:

1) Change the study mode of postgraduates and enhance the initiative of postgraduates. Problem-oriented teaching emphasizes the self-inquiry ability of postgraduates, encouraging teachers and students to jointly explore the answers to questions through communication and collaboration. While motivating graduate students to solve problems, a variety of teaching strategies are also applied to help students judge, compare, optimize, consolidate, and remember knowledge. Problem-oriented teaching helps graduate students to keep up with teachers' teaching ideas and enhance students' initiative in learning.

2) Pay attention to the forming of knowledge system of postgraduates and enhance the exploration consciousness of postgraduates. The process of knowledge forming is based on students' experience of independent inquiry, cooperation and exchange. Through the forming of knowledge system, graduate students can be deeply aware of the application value of knowledge and get their awareness of exploration and innovation enhanced. Teachers can make graduate students form a knowledge and information network by consciously linking knowledge inside and outside the classroom and linking knowledge points in different disciplines.

3) Fully respect the individuality of postgraduates and cultivate postgraduates' problem awareness and innovative thinking ability. Postgraduates complete their studies independently. Teachers, as observers, guides, and organizers, allow postgraduates to better develop their strengths and cultivate their abilities in the classroom. Focusing on solving problems, Teachers encourage the behavior of postgraduates to think about problems independently, pay attention to the cognition

before postgraduate study, and cultivate postgraduate experiential learning. In the process of consolidating and feedback, teachers should take full account of the various characteristics of graduate students and respect the differences between students.

### **3. The Practice of Problem-Oriented Teaching Method in the Cultivation of Graduate Students' Scientific Research Innovation Ability**

Graduate students need to be led by teachers in conducting research experiments in scientific research, and there are always many factors that affect their research in the process for junior graduate students [4]. In terms of internal factors, the main ones include learning method barriers, insufficient cognitive ability and insufficient practical experience [5]. External factors mainly include teachers, research platforms and policies, research team collaboration and communication [6]. The problem-oriented teaching method should improve the following aspects in the cultivation of graduate students' scientific research innovation ability.

#### **3.1 Teachers should Stimulate the Internal Motivation of Postgraduates' Autonomous Learning**

Modern society requires postgraduates to "learn to learn, learn to be, learn to cooperate, and learn to survive", and everyone must have the will and ability to learn for life to adapt to the rapid development of society. As a teacher, the main tasks should not be teaching classroom knowledge only, but include stimulating the independent study of postgraduates, guiding, organizing and managing the learning process, and cultivating postgraduates' group collaboration ability as well as raising awareness of self-learning. By guiding students to analyze the problem by themselves and find out what the key information of the problem is, the problem-oriented teaching method can obviously improve the students' academic performances and problem cognition skills [7]. Learners can deal with relevant problems encountered by critically identifying and understanding problems, as well as establishing relevant knowledge templates and knowledge systems, so that they can think more flexibly [8]. In the educational process of cultivating graduate students' scientific research and innovation ability, teachers must know how to stimulate the enthusiasm and motivation of graduate students, so that students can have a psychological experience of anxiety and desire, and finally take self-learning actions.

#### **3.2 Teachers should Improve Graduate Students' Scientific Research and Innovation Ability in Process Inquiry**

The cultivation of graduate students' scientific research and innovation ability requires tutors to formulate a complete and appropriate training plan and give clear and specific guidance [9]. In daily teaching, teachers can ask students questions rhythmically about the key points and difficulties of scientific research content. After the teacher and the graduate students analyze the problem together, the group members discuss the problem, and the students solve the problem (at the same time, the teacher must make correct comments). After the problem is solved, the learning results are shared and communicated among groups, and finally the teacher summarizes and reflects.

Take the application of problem-oriented teaching method in the course as shown in Figure 1.

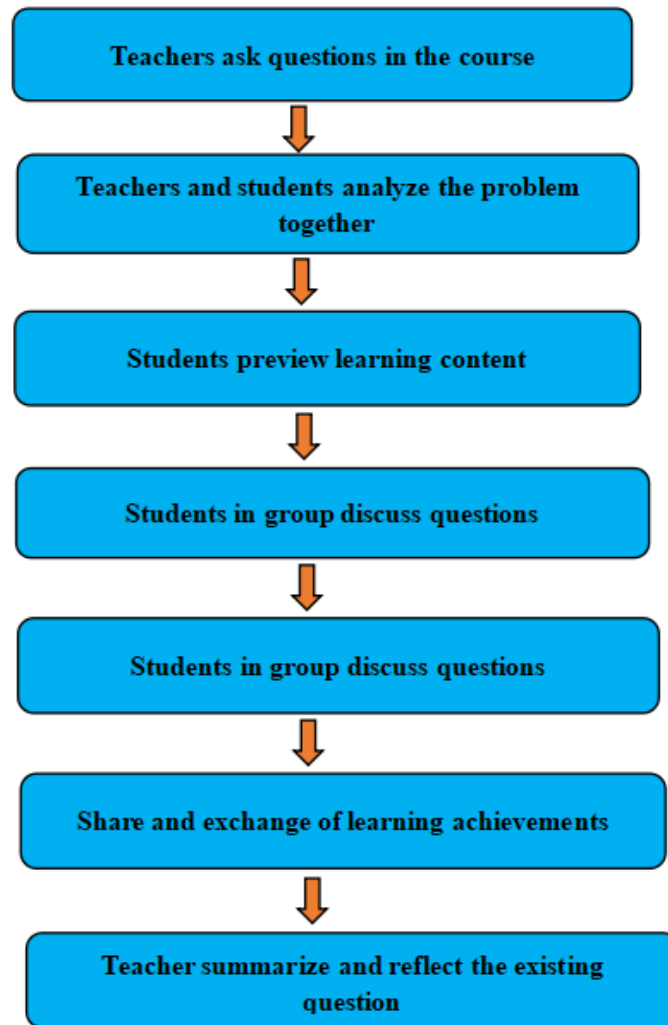


Figure 1: The application of problem-oriented teaching method in the course of graduate students

### **3.3 Encourage Graduate Students to Participate Actively in Scientific and Technological Competitions and Academic Conferences, and Strengthen Communication and Guidance outside the Classroom**

The research interest shown by postgraduates is inseparable from the teaching and guidance of teachers. Learning outside the graduate classroom is also inseparable from the guidance and close attention of teachers. Graduate students should take the initiative to seek guidance from teachers outside the classroom as a way of promoting communication between teachers and students. The school can guide students to participate in the competition by organizing postgraduate science and technology competitions, academic exchange competitions, dissertation translation competitions and other activities, so as to form scientific research teams, strengthen communication between teams, and enhance students' enthusiasm for scientific research and innovation. The commitment and attention of postgraduates to professional fields will also encourage teachers to further think about relevant academic issues and deepen academic research. Through constant sharing and communication between students and teachers, students are able to gain more and more confidence

in taking actions and forming judgments [10].

### 3.4 Encourage Graduate Students to Actively Publish Scientific Papers to Improve the Ability to Find Problems

Papers represent the achievements of scientific research and innovation at a certain level. For graduate students, participating in research can help them gain insight and learn real skills. Through thesis writing, graduate students can learn how to think with academic thinking, learn the methods and skills of doing research, and learn to understand complex and profound knowledge theories in practice.

## 4. Conclusion

Problem-oriented teaching can improve the enthusiasm of postgraduates to study. It can be seen that the problem-oriented teaching is conducive to cultivating the innovative ability of postgraduates, highlights the dominant position of students, which can help students develop the good habit of analyzing problems and classifying problems and play an important role in the process of cultivating graduate students' scientific research innovation ability.

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