

# Application of Heuristic Method to the Clinical Teaching of Internal Medicine

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**Abstract:** There is an old saying, "Give a man a fish, and he will eat for a day. Teach a man to fish, and he will eat for the rest of his life." In clinical teaching, students should not only be taught about diseases, but their intelligence should also be cultivated, along with their analytical, comprehension, and independent learning skills. The ability to solve problems enables students to think independently and acquire knowledge. This is known as the heuristic method of teaching. In this study, we mainly analyze the application value of the heuristic method in the clinical teaching of internal medicine.

**Keywords:** Heuristic method of teaching; Internal medicine clinical teaching; Application

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## 1. Introduction

The heuristic method of teaching is an advanced educational concept and teaching method, which can enlighten students' thinking, prompt students to carry out targeted learning according to the teaching objectives, and strengthen the teaching effect. The application of this method in clinical teaching is relatively valuable.

## 2. Overview of the heuristic method of teaching

The heuristic method of teaching is based on the tasks given and the learning rules, beginning from the actual needs of the students, and adopting various means to stimulate students' thinking and mobilize students' enthusiasm for learning. This is not only a teaching method, but also an educational idea. In talent training, stimulating students' thinking has always been the focus of attention. The implementation of this method requires clear goals, diverse models, and rich methods.

## 3. Heuristic method of teaching

### 3.1. Contrastive heuristic method

In the clinical teaching of internal medicine, common diseases need to be explained to students. Although there are some similarities in the manifestations of common diseases, each disease has its own characteristics. For students who have never experienced actual clinical situations, they often face certain difficulties in the learning process. The application of contrastive heuristic method mainly stimulates students' thinking and follows the basic principles of seeking differences within similarities and seeking

similarities within differences. For example, when explaining the clinical manifestations of pneumothorax, a detailed explanation should be given according to different clinical characteristics; for instance, if a patient has simple pneumothorax, air does not enter nor exit; if a patient has communicating pneumothorax, air enters and exits; if a patient has tension pneumothorax, air only enters and does not exit. When explaining the clinical features of pleural effusion and pneumothorax to students, the comparison and similarity method can be used to summarize as follows: (i) upon inspection, the patient's chest appears full, and the degree of respiratory activity decreases to a certain extent; (ii) upon palpation, the position of trachea has shifted to the healthy side; (iii) upon auscultation, reduced breath sounds are heard on the affected side. The difference is in percussion; when percussing for pleural effusion, the affected side will appear dull, but when percussing for pneumothorax, there is hyperresonance.

### **3.2. Activity heuristic method**

In order to broaden the horizons of students, teaching activities such as case discussions can be carried out. When discussing cases, students are encouraged to speak and express their own ideas. This method cultivates and improves students' independent thinking and problem-solving skills. The application of this method not only improves students' expressiveness, but also fully mobilizes students' enthusiasm for learning. Visitations can also be organized, so that students would be inspired through practical activities. For example, after explaining about hemodialysis, a visitation to an artificial kidney center can be organized. This allows students to familiarize themselves with dialysis equipment and its operation methods in person, so as to deepen their theoretical understanding.

### **3.3. Image heuristic method**

Physical objects, charts, and languages are commonly used "images," which can effectively stimulate students' thinking. Teachers can combine the explanation contents to create corresponding images, provide intuitive feelings to the students, inspire the students, and deepen their understanding of relevant knowledge points. For example, when explaining about internal medicine diagnosis and treatment technology as well as cardiopulmonary resuscitation-related knowledge, videos can be used for intuitive teaching to effectively stimulate students' interest, followed by physical operations to strengthen students' understanding.

### **3.4. Action heuristic method**

In the process of teaching, teachers can use gestures to create certain enlightening effects. Especially for the symptoms and signs of diseases, gestures can be used for explanation. For instance, by asking students to stretch out and open their hands, showing their ten fingers, and then close their eyes and move their metacarpophalangeal joints, this action would deepen the impression on students. Other than that, when explaining about bronchial diseases, the corresponding actions and expressions of patients with bronchial asthma can be simulated to help students have a better understanding of the clinical manifestations of the disease.

## **4. Application and practice of heuristic method in the clinical teaching of internal medicine**

There are many types of diseases in internal medicine that are relatively complex. One of the difficulties faced by students is to give accurate diagnoses and treatment plans for specific cases. In this regard, the heuristic method of teaching should be adopted through multi-form and multi-directional methods to stimulate students' thinking, so as to encourage them to think actively about clinical problems and improve their knowledge of cases through the interaction between teachers and students. It is also necessary to address the issue of participation among students and mobilize their enthusiasm, so as to cultivate a scientific clinical thinking mode among students.

Li<sup>[1]</sup> chose to apply this method to the teaching of nursing in internal medicine. By comparing with the traditional teaching method, Li found that the use of this method can improve students' theoretical knowledge and practical skills as well as strengthen their ability. He *et al.*<sup>[2]</sup> also applied this method to the teaching of nursing in internal medicine. Through heuristic lesson preparation, students were taught in accordance with their aptitude to stimulate their motivation for learning. The study concluded that the heuristic method can deepen students' understanding, as evident by the favorable results achieved. Ye *et al.*<sup>[3]</sup> applied this method to the clinical teaching of internal medicine, comparing it with the traditional teaching method, and found that it can improve students' skills and stimulate learning interest.

Yang *et al.*<sup>[4]</sup> proposed the use of this method for case teaching in internal medicine and incorporated it with action orientation, insinuating that the leading role of teachers and the main role of students can be fully realized through this method. The streamline approach of dividing cases into sections, selecting typical cases, collecting data, constructing preliminary solutions, discussing and analyzing, further collecting and reading data, drawing final solutions, and reporting to teachers can improve the mastery of clinical knowledge in internal medicine. Chang *et al.*<sup>[5]</sup> chose the analogy method to be used in conjunction with this method and applied it to the teaching of nursing in internal medicine; they found that on the basis of the knowledge and skills that have been mastered, students' subjective initiative can be brought into play, changing the unknown into known and abstraction into image, as well as minimizing the difficulty of knowledge points, thus completing knowledge transfer and successfully achieving the teaching objectives.

Ye *et al.*<sup>[6]</sup> applied the case heuristic method to the clinical teaching of nurses in general practice wards. There were significant improvements in the score and teaching satisfaction. On the other hand, Ma *et al.*<sup>[7]</sup> applied the heuristic method combined with the case teaching method to the clinical teaching under the department of endocrinology. Compared with the traditional teaching method, they found that the theoretical and practical assessment scores of the observation group were higher than those of the control group. At the same time, the scores obtained by the observation group for active learning, communication skills, innovative practice, and teamwork were significantly higher than those obtained by the control group ( $P < 0.05$ ). Jiang *et al.*<sup>[8]</sup> used the problem-oriented heuristic method and applied it to the pre-job training of new nurses in the anesthesiology department. They found that satisfaction with the teaching method can promote the rapid adaptation of new recruits to the position.

Yang *et al.*<sup>[9]</sup> used the case heuristic method to manage the teaching of junior nurses and found that it can effectively improve the theoretical knowledge, practical skills, and satisfaction of nurses with the teaching management. Wang *et al.*<sup>[10]</sup> applied the case heuristic method to the teaching of nursing students in gastrointestinal surgery and found that it can improve their theoretical operation assessment scores and satisfaction level with the teaching management. Yao *et al.*<sup>[11]</sup> used this teaching method to cultivate critical thinking skills among nursing school students and found that it can improve students' ability to discover the truth and think openly, analytically, and systematically; boost students' self-confidence in decision-making; inspire curiosity among students; and improve students' cognitive maturity, overall score, and teaching satisfaction.

Huang *et al.*<sup>[12]</sup> applied the heuristic method to the teaching of formula science through the heuristic process of induction, analogy, questioning, case reflection, and case discussion to improve students' enthusiasm for learning, innovate traditional Chinese medicine (TCM) thinking, effectively improve the quality of teaching, and cultivate TCM talents. Ren<sup>[13]</sup> applied the heuristic method combined with case-based learning and found that it can improve the theoretical performance, case analysis skills, comprehensive ability, and teaching satisfaction of doctors trained in TCM dermatology. Chen<sup>[14]</sup> used this method combined with action learning and found that it can improve the theoretical and nursing skill assessment scores of nursing interns in TCM gynecology and strengthen the overall teaching effect and teaching satisfaction. Li<sup>[15]</sup> used this method in combination with the discussion teaching method and found

that it can improve students' active participation and classroom response to the theoretical knowledge of digestive internal medicine, which not only improves learning efficiency, but also helps exercise students' thinking skills and improves the teaching quality.

## 5. Conclusion

In the clinical teaching of internal medicine, the application of heuristic method has achieved good outcomes. Compared with the traditional teaching method, it can better stimulate students' learning initiative and improve the learning effect.

## Disclosure statement

The authors declare no conflict of interest.

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