

# Thoughts on the Construction and Application of the Knowledge Graph for the Course of Internal Medicine Nursing

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**Abstract:** As a core course for nursing majors, Internal Medicine Nursing mainly covers basic medical knowledge and key nursing points for common internal medicine diseases. It is characterized by complicated knowledge points and a strong interdisciplinary nature. Under the traditional teaching mode, students find it difficult to understand the internal relations and logic among knowledge points, which is not conducive to constructing a systematic knowledge system and improving clinical application ability. As a visual knowledge organization tool, a knowledge graph can transform complex concepts into visual symbols, effectively integrate scattered knowledge points and clarify knowledge connections. On this basis, starting from the main functions of constructing a knowledge graph for the Internal Medicine Nursing course, this paper discusses its specific application paths, so as to provide a theoretical reference for improving the teaching quality of the course and realizing teaching reform.

**Keywords:** Nursing major; Internal Medicine Nursing course; Knowledge graph; Clinical application ability

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## 1. Introduction

The Internal Medicine Nursing course for nursing majors covers multiple sub-specialty knowledge, such as the respiratory system, circulatory system and digestive system. The knowledge points are complicated and scattered, highly interdisciplinary, and closely related to clinical practice. Its core goal is to cultivate high-quality nursing talents with systematic professional knowledge, solid clinical skills and independent learning ability. With the rapid development of educational informatization and intelligence, the knowledge graph, with its structured and networked characteristics, can effectively integrate scattered course knowledge, clearly present knowledge nodes and their connections, help students build a new learning path<sup>[1]</sup>, and thus form a logical knowledge system based on analysis, induction and reasoning. The application of the knowledge graph in Internal Medicine Nursing can not only innovate the teaching mode and improve teaching quality, but

also enhance students' independent learning ability and clinical application ability, promoting the quality and efficiency of nursing talent training.

## **2. Main functions of constructing a knowledge graph for internal medicine nursing**

### **2.1. Breaking the dilemma of knowledge fragmentation and building a complete knowledge system**

Internal Medicine Nursing has complicated and highly interdisciplinary knowledge points, involving basic medicine, clinical medicine, nursing ethics and other disciplines. Under the traditional teaching mode, the knowledge points of Internal Medicine Nursing are mostly fragmented, making it difficult to grasp the internal logical connections among knowledge and impossible to build a complete course knowledge system<sup>[2]</sup>.

A knowledge graph can accurately classify and sort out the knowledge of Internal Medicine Nursing, clarify the logical and internal relations among each knowledge point, and divide them into specific core modules. For example, the core knowledge of the course can be divided into core modules such as disease nursing, nursing skills, nursing theory and clinical thinking, and then specific knowledge nodes can be subdivided under each module. In this way, the internal connections among different diseases, between diseases and nursing skills, and between nursing theory and clinical practice can be clarified, breaking the isolation of knowledge points.

In addition, students can accurately grasp the key knowledge points with the help of the knowledge graph, clarify the logical connections among knowledge points, understand the internal essence of knowledge, and improve the systematicness and coherence of knowledge learning<sup>[3]</sup>.

### **2.2. Optimizing the teaching process and improving the teaching quality of the course**

As a structured knowledge organization tool, the knowledge graph plays an important role in the teaching process. It can effectively promote the innovation of teaching methods, strengthen teacher-student interaction, realize the optimization and upgrading of teaching implementation, and comprehensively improve the teaching quality and effect of the course.

On the one hand, Internal Medicine Nursing has numerous knowledge points with different importance and difficulty. In the process of constructing a knowledge graph, teachers can hierarchically divide and correlate knowledge nodes, clarify the core knowledge points, key contents and difficult contents of the course, to rationally allocate teaching time and energy, focus on explaining core and difficult knowledge points, and improve the pertinence and efficiency of teaching<sup>[4]</sup>.

On the other hand, teachers can use the knowledge graph to understand students' mastery of knowledge and comprehensive ability, analyze students' knowledge construction, accurately locate students' weak links in knowledge learning, and carry out targeted personalized tutoring and teaching improvement to improve the teaching quality of the course.

### **2.3. Transforming knowledge forms and strengthening independent learning ability**

Since the knowledge points of Internal Medicine Nursing are abstract and complex, some students find it difficult to deeply grasp the specific connotation of the knowledge. By constructing a knowledge graph, students can clearly grasp the overall framework of the course knowledge system, the hierarchical relations and connection types of each knowledge point, clarify their learning objectives and paths, rationally formulate

independent learning plans, carry out targeted learning activities, avoid the blindness of independent learning, and improve the efficiency and effect of independent learning<sup>[5]</sup>.

At the same time, the knowledge graph is visual and can transform abstract knowledge connections into intuitive graphics, so as to stimulate students' interest in learning. Thus, students can independently sort out the connections among knowledge points, form their own knowledge cognitive system, get rid of the traditional learning method of rote memorization, and cultivate logical thinking ability and independent inquiry ability.

In addition, in the process of independently sorting out knowledge connections and exploring knowledge connotations, students can gradually improve their ability to analyze and solve problems, and learn to use the knowledge they have learned to analyze and solve relevant problems in clinical nursing.

### **3. Core principles for the implementation of the knowledge graph for internal medicine nursing**

#### **3.1. Adhering to professional orientation and ensuring the accuracy of the knowledge system**

As a core course for nursing majors, Internal Medicine Nursing connects basic medicine and clinical nursing. The accuracy and professionalism of its knowledge are directly related to the cultivation of students' professional literacy and the improvement of clinical practice ability.

In the construction stage of the knowledge graph, it is necessary to accurately sort out the core knowledge modules and key knowledge nodes of the course in strict accordance with the professional knowledge system of Internal Medicine Nursing, clarify the professional connotation and hierarchical relationship of each knowledge node, and ensure that every knowledge point included in the knowledge graph meets the nursing professional norms and course teaching requirements, fits the professional standards of clinical nursing practice, and avoids knowledge deviation, redundancy or omission<sup>[6]</sup>.

At the same time, it is necessary to highlight the core orientation of the nursing major, focus on core professional contents such as disease nursing, nursing diagnosis and nursing measures, weaken redundant information irrelevant to the core of the course, and base on the needs of clinical nursing practice to ensure that every knowledge point and every connection in the knowledge graph meets the nursing professional norms and clinical nursing practice standards, helping students transform knowledge into practice.

#### **3.2. Based on teaching effectiveness and promoting the efficient implementation of the knowledge graph**

In the process of constructing a knowledge graph, teachers should base their teaching on the teaching objectives of the Internal Medicine Nursing course, integrate the knowledge graph into the whole teaching process, make it serve the teaching implementation, effectively solve the problem of knowledge fragmentation in traditional teaching, and thus improve teaching quality.

In the implementation process, teachers need to sort out the core dilemmas in teaching in depth, combine the characteristics of complicated knowledge points and strong interdisciplinary nature of Internal Medicine Nursing, clarify the application paths of the knowledge graph in different scenarios such as teaching implementation, independent learning and teaching evaluation, to help students sort out and construct a knowledge system and improve learning effects<sup>[7]</sup>.

At the same time, teachers need to design a clear and logically rigorous implementation process, avoid

complex operating procedures, ensure that the knowledge graph can adapt to the rhythm of daily teaching, and be convenient for teachers and students to use and adjust flexibly at any time.

### **3.3. Giving play to the value of two-way empowerment and improving teaching effectiveness**

The knowledge graph is characterized by integration and coordination. It can not only be implemented collaboratively with diversified teaching modes, but also adapt to the personalized needs of teachers and students, effectively improving teaching quality<sup>[8]</sup>.

On the one hand, in the teaching process, teachers can rely on the knowledge graph to intuitively express teaching ideas, methods and key points, help students sort out the course knowledge structure more clearly and accurately grasp the key and difficult points of learning. At the same time, they can optimize the teaching content design and process arrangement, promote the innovation of teaching methods, and improve the pertinence and efficiency of teaching.

On the other hand, teachers can take into account the learning needs of students at different levels and design hierarchical knowledge graphs, which can not only meet the needs of students with weak foundations to sort out basic knowledge, but also provide space for students with spare capacity to expand knowledge, realize personalized learning empowerment<sup>[9]</sup>, and promote the improvement of students' professional literacy.

## **4. Construction and application strategies of the knowledge graph for internal medicine nursing**

### **4.1. Sorting out course knowledge points and building a complete knowledge system**

The Internal Medicine Nursing course for nursing majors covers basic medicine, clinical medicine, nursing ethics and other disciplines, and the relevant knowledge points of diseases in each system are interrelated and relatively independent. It plays an important role in helping students sort out course knowledge points and build a complete knowledge system, which can not only deepen and consolidate their knowledge foundation but also help them apply knowledge in practice<sup>[10]</sup>.

Firstly, based on the teaching syllabus of Internal Medicine Nursing and the training objectives of nursing majors, comprehensively sort out the core knowledge contents of the course, focus on core professional contents such as disease nursing, nursing diagnosis, nursing measures, clinical thinking and nursing skills, divide these course contents into several core modules, and then subdivide secondary and tertiary knowledge nodes under each module. Clarify the core connotation, boundary scope and hierarchical relationship of each knowledge node, to build a knowledge system by using the knowledge graph.

Secondly, deeply analyze the internal logical relations among each knowledge node, clarify the connection types and connection strengths, connect different knowledge nodes through visual edges, clearly present the internal connections among knowledge, break the isolation of knowledge points, and realize the network integration of knowledge. For example, teachers can clarify the causal connections among disease etiology, pathophysiology and clinical manifestations, and use the knowledge graph to clearly present the logical context of course knowledge, helping students build systematic knowledge cognition<sup>[11]</sup>.

Finally, teachers need to sort out knowledge according to teaching objectives, unit themes and key and difficult points, accurately screen core and secondary knowledge nodes, highlight the dominant position of core knowledge, and present the knowledge framework in a concise, intuitive and easy-to-understand visual

form to help students consolidate their knowledge foundation.

## **4.2. Strengthening the whole teaching process and broadening the application scenarios of the knowledge graph**

Teachers should give full play to the core role of the knowledge graph in the teaching of Internal Medicine Nursing, base on the actual teaching needs, combine the course characteristics and students' cognitive rules, optimize the application mode, so that the knowledge graph can adapt to different teaching scenarios and truly integrate into daily teaching links, to improve the effectiveness of course teaching<sup>[12]</sup>.

Firstly, in course teaching, teachers can use the knowledge graph to grasp the overall framework and knowledge connections of the course knowledge system, accurately locate the key and difficult points of teaching, rationally allocate teaching time and energy, optimize teaching content design and process arrangement, and improve the fluency and systematicness of teaching.

Secondly, teachers can take the knowledge graph as the core tool for teaching mode innovation, guide students to clarify learning objectives and paths with the help of the knowledge graph, rationally formulate independent learning plans, and carry out targeted learning activities. At the same time, hierarchical knowledge graphs can be provided according to students' personalized learning needs: students with weak foundations can focus on learning core knowledge nodes, and students with spare capacity can conduct in-depth learning by expanding knowledge nodes, so as to realize personalized independent learning empowerment<sup>[13]</sup>.

Finally, teachers can rely on the knowledge graph to build a diversified teaching evaluation system, comprehensively evaluate students' construction of the knowledge graph, mastery of knowledge nodes and understanding of knowledge connections, and objectively reflect students' knowledge mastery, independent learning ability and logical thinking ability.

## **4.3. Innovating course teaching methods by using the knowledge graph**

The knowledge graph has remarkable characteristics of networking, intelligence and structuring. Relying on its powerful functional advantages, teachers can build a diversified teaching mode that is student-centered, knowledge integration-oriented and ability cultivation-oriented, so as to realize systematic teaching.

In classroom teaching, teachers can design inquiry-based teaching activities, and with the help of the visualization function of the knowledge graph, guide students to sort out the knowledge context and clarify knowledge connections around the knowledge graph. Through questioning guidance, thinking inspiration and other ways, teachers can guide students to take the initiative to explore knowledge connotation and cultivate students' logical thinking ability and independent inquiry ability<sup>[14]</sup>.

In addition, teachers can carry out online and offline blended teaching activities to broaden teaching scenarios and improve teaching quality. In the online part, teachers should take the knowledge graph as the core learning resource, upload it to the online teaching platform, match it with relevant teaching courseware, exercises, documents and other resources, guide students to independently preview with the help of the knowledge graph, and let students independently sort out the knowledge context and clarify knowledge connections<sup>[15]</sup>.

In the offline part, teachers can carry out targeted explanation and interactive discussion based on the knowledge graph, strengthen students' understanding and mastery of knowledge, realize closed-loop teaching of online preview, offline intensive explanation and online review, improve the effectiveness of blended teaching, further innovate teaching methods and improve teaching quality.

## 5. Conclusion

In summary, the knowledge graph provides effective support for the teaching reform of Internal Medicine Nursing. By building a complete knowledge system, broadening application scenarios and innovating teaching methods, we can break the dilemma of knowledge fragmentation, optimize the teaching process, and strengthen students' independent learning and clinical application ability.

## Disclosure statement

The authors declare no conflict of interest.

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