

## Reform of Medical Imaging Teaching Mode in 5G Era

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**Abstract:** With the rapid development of the construction of medical imaging discipline, medical imaging information system has been widely used in the teaching of imaging departments. It can improve the quality of teaching and further strengthen pupils' understanding and memory, so it is widely recognized by imaging pupils. The application of medical image information system in the teaching of imaging specialty is an important measure to adapt to the current digital teaching trend. This paper proposes an optimized design scheme of medical imaging teaching mode in the 5G era, aiming to explore how to reform the teaching of medical imaging specialty based on the 5G background teaching method, realize the “student-centered” education concept through information technology, improve the teaching quality, and cultivate modern imaging talents to meet the needs of clinical diagnosis in the new situation. Under the trend of big data in medical imaging discipline, medical imaging information system combines traditional teaching methods for teaching, which plays an important role in improving the quality of imaging teaching and pupils' clinical practice ability, and is worth learning from and promoting in clinical medicine teaching.

### 1. Introduction

Medical imaging is an important bridge course connecting basic medicine and clinical medicine. The traditional teaching mode can not meet the needs of pupils' development in terms of both teaching methods and teaching effects[1]. With the rapid development of medical imaging technology and the continuous emergence of new and high technologies, the diagnosis and treatment technologies are diversified and integrated, and gradually develop towards the direction of minimally invasive or minimally invasive[2]. The scope of image diagnosis knowledge is expanding. For example, new functional technologies have been integrated into the knowledge of medical biology, medical physics and other disciplines of psychology. Imaging examination has developed from displaying only the macroscopic morphological changes of human structure to pathological changes that can display microscopic molecules and metabolic levels, enabling many diseases to be diagnosed early and treated in time[3]. For this reason, how to make medical undergraduate pupils adapt to the needs of social development, make them master the basic knowledge of medical imaging in limited class hours, understand the current situation and development trend of imaging, and correctly use medical imaging examination is a new challenge facing medical imaging teachers.

With the advent of the 5G era, high and new technologies such as mobile Internet, Muke, mobile medical, and APP are emerging[4]. The school actively builds a medical education platform and provides digital education resources, so as to expand the coverage of high-quality medical education resources[5]. Medical education institutions have established network education, online learning and training, and established a credit conversion system to provide new training models for medical pupils[6]. Medical colleges and enterprises jointly develop appropriate medical education software to provide new ways for public education services[7]. The traditional teaching oriented model has long been questioned. Modern 5G education advocates learning as the center and teaching as the supplement[8]. It is not simply the accumulation and transmission of media, but the exploration of a

new educational model. Guided by the cultivation of pupils' innovation and entrepreneurship ability, it further reflects the fundamental requirements of the society for the cultivation of compound talents' quality, knowledge and ability structure. It has the characteristics of network teaching, resource sharing, and diverse materials, which can facilitate pupils to learn high-quality courses from world famous universities[9]. Provide rich and diverse teaching resources, such as perfect combination of pictures, animation, audio, video and theoretical knowledge, to provide pupils with more efficient learning scenes and materials.

With the advent of 5G era, a large number of initial data can be scientifically sorted, classified and analyzed to form a database, so as to quickly obtain important information and complete various tasks. This not only promotes the close integration of traditional enterprises and information industry, but also puts forward new challenges and hopes for the progress and reform of medical education[10]. This paper discusses a series of changes that the medical image teaching model may face in the 5G era. The technical features of 5G, such as high speed, large bandwidth, ubiquitous network, low power consumption, high reliability, low latency, and interconnection of everything, make the Internet truly integrated into all aspects and functions of medical imaging, and bring about disruptive changes to the teaching mode. Its innovation lies in:

This paper constructs the key features of the optimization design system of medical image teaching mode, and combines the 5G era background to realize the optimization design and identification of medical image teaching mode.

The research framework of this paper is as follows:

The first section is the beginning. It mainly describes the research background and value of the subject, and puts forward the research purpose, method and innovation of this paper. The second section is the research method, mainly the optimization design method of the subject. The third section is the experimental part. This part has carried on the experimental verification in the data set, and analyzed the performance of the model. The fourth section is conclusion and prospect. This part mainly reviews the main contents and results of this study, summarizes the research conclusions and points out the direction of further research.

## 2. Methodology

### 2.1 Constructing Image Teaching System

The main application objects of medical imaging teaching system are pupils and teachers of imaging specialty. Therefore, the teaching function design of medical imaging teaching system is mainly aimed at pupils and teachers. Common medical image teaching functions include comprehensive diagnosis teaching, on-site teaching, probation teaching, expert opinion, news, discussion, relevant resources, examination, retrieval, news, etc. The overall structure and function of the teaching function of the video teaching system are shown in Figure 1.

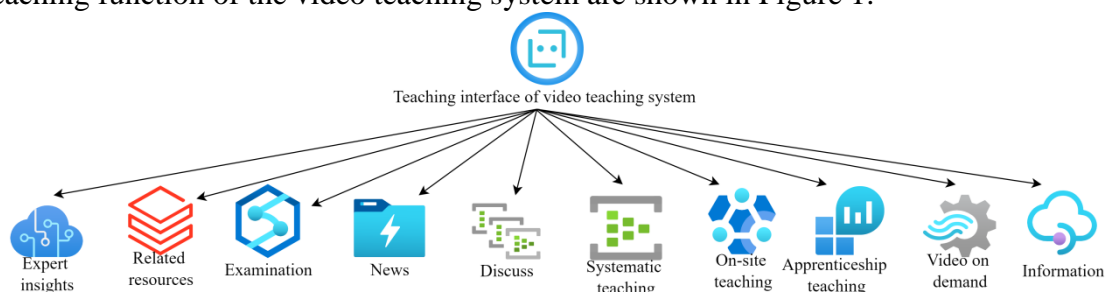


Fig.1 Function Interface of Video Teaching Platform

Modern medical imaging includes conventional radiology, magnetic resonance, ultrasound, pathology, endoscopy, nuclear medicine and other professional knowledge and technologies. It has expanded from traditional single line diagnosis to multiple imaging disciplines, and has become a comprehensive discipline integrating imaging diagnosis and interventional therapy. After years of development, the medical imaging teaching system has two characteristics of modern medical

imaging and remote network teaching, ensuring that medical resources are related to all the inspection categories of modern medical imaging, and that image resources are shared on the network, remote teaching, and teaching resources are digitized, which is convenient for storage and transmission. Therefore, the image teaching system has a huge amount of data, many types of image inspection data, diverse data formats, and very complex storage and management. In order to facilitate pupils' systematic and hierarchical understanding and learning of medical imaging, medical imaging teaching is centered on knowledge points.

The database design of the medical image teaching system is a complex process, which includes the design of many image teaching function tables and the design of management tables, such as the design of image case collection function tables, the design of user management function tables, the design of comprehensive diagnosis teaching tables, the design of on-site teaching tables, the design of probation teaching tables, the design of news tables, the design of case discussion tables Design of online examination forms, etc. The design of medical image teaching system database should not only meet the needs of image teaching, conform to the habits of image teaching, but also meet the storage requirements of clinical data source acquisition and transmission. With the continuous development of the image teaching system with the progress of time and technology, the image teaching function will continue to increase, so the design of the image teaching database will also continue to progress and improve.

The data storage of comprehensive diagnosis teaching needs to deal with the relationship between system knowledge points and image examination cases. In general, each knowledge point of the comprehensive diagnosis teaching system may be used to illustrate the image diagnosis of one or more cases, and each case may contain multiple image examinations, but each case is only a case of one patient. Each imaging examination has information such as examination image, examination report, examination category, examination item, etc., but there may be many imaging examinations in the examination category and examination item. Therefore, the various entity relationships of comprehensive diagnosis teaching are shown in Figure 2.

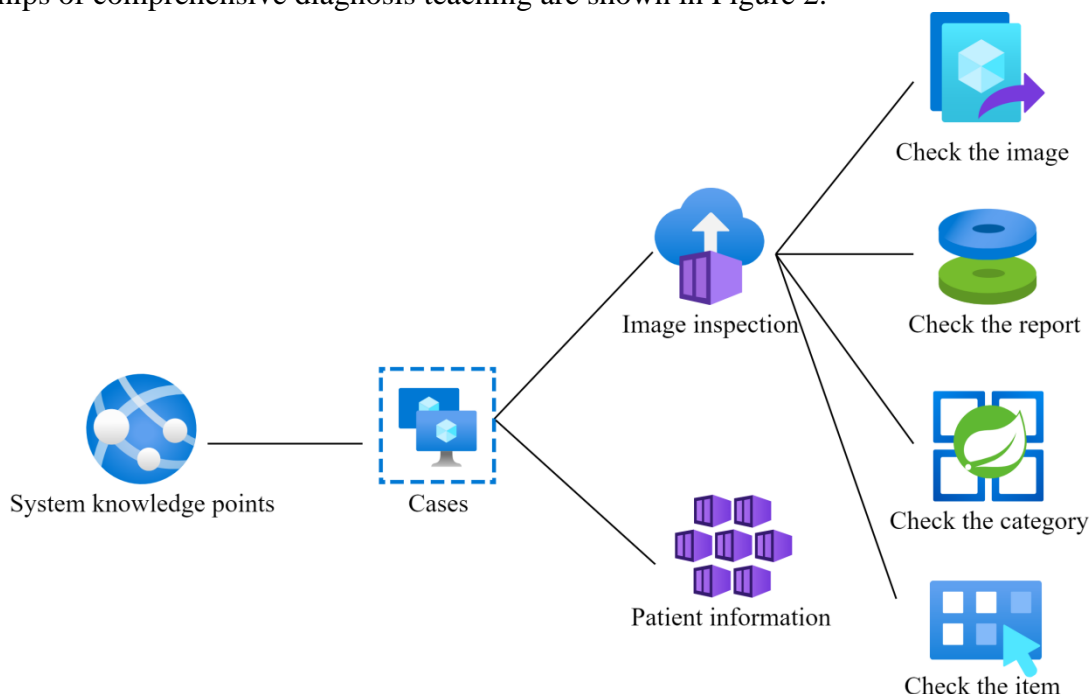


Fig.2 Entity Relationship Diagram of Comprehensive Diagnosis Teaching

### 3. Result Analysis and Discussion

The teaching method of medical imaging specialty in most medical colleges is too old and single. Traditional teaching is carried out in the way of “film combined with film viewing lamp”. In this teaching method, teachers first select effective film, and then use film viewing lamp to teach and

explain. This not only increases teachers' teaching tasks, but also makes it difficult to diagnose the pathological changes on the film, which greatly affects the teaching quality. Therefore, in order to develop medical imaging specialty, we must carry out effective reform and innovation in this specialty. To train pupils to design the simplest and most effective image examination method according to the clinical application form of the examinee, and gradually form a complete set of image theory system, so that pupils can become qualified medical image talents. Medical imaging plays an important guiding role in professional teaching and clinical diagnosis in colleges and universities. It is an effective bridge connecting marginal medicine and clinical medicine. It focuses on the use of anatomy, physiology, pathology, internal and external women and children and other clinical basic theories, combined with imaging manifestations to diagnose various diseases.

### **3.1 Teaching Methods**

(1) The pupils were taught in the subject of imaging by traditional teaching methods. The teachers collected imaging data and images, made slides, and taught the pupils in combination with theoretical knowledge.

(2) In the traditional teaching mode, the teaching was conducted in combination with the medical image information system. The specific measures were as follows: ① The teacher selected relevant clinical cases through the image information system on the basis of theoretical knowledge combined with relevant image data to explain to pupils, explained to pupils from different angles and levels, put forward questions, let pupils discuss, negotiate and find the correct answer. ② The experimental course of medical image information system is set up to make pupils more exposed to digital systems in practice, and teach pupils how to use the medical image information system to query relevant image data. And through the link to share the image information resources of other hospitals, we can better understand the huge convenience brought by the medical image information system.

### **3.2 Observations**

Compare the students' learning achievements, evaluation of teaching effects and satisfaction of the two teaching methods. ① The pupils' scores are scored in a classroom test. After each lecture, all pupils are tested for the knowledge they have taught. The same video data is used and a unified scoring standard is selected. The full score is 100. ② The evaluation of teaching effect is in the form of questionnaire. The main contents of the survey are learning enthusiasm, knowledge understanding, knowledge breadth, course content impressiveness, and novelty of teaching methods. The total score of each item is 10 points. The results show that students who study with medical image information system have higher academic performance and better teaching effect.

## **4. Conclusions**

This paper proposes an optimized design scheme of medical imaging teaching mode in the 5G era, aiming to explore how to reform the teaching of medical imaging specialty based on the 5G background teaching method, realize the “student-centered” education concept through information technology, improve the teaching quality, and cultivate modern imaging talents to meet the needs of clinical diagnosis in the new situation. With the super high speed and large bandwidth of 5G technology, hospitals can use AI to integrate and analyze multi-dimensional big data such as pathology, imaging, endoscopic results report, and assist clinicians to make more efficient and accurate diagnosis. The effective combination of multimedia network technology and information technology has promoted the reform of medical imaging education and teaching mode, fundamentally changing the traditional medical education and teaching mode. Pupils can choose courses individually to complete learning, improving the effectiveness and flexibility of learning, and effectively improving the teaching effect. This study also has shortcomings: on the one hand, this study did not make statistics and comparison on the time invested by pupils, and failed to pay further attention to the impact of learning time on learning effect. On the other hand, the proportion

theory of process evaluation and summative evaluation and the weight of film reading test need to be further studied in the future.

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