Practical Analysis of Integrated Multimedia Technology in Medical Imaging Teaching

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Abstract. With the innovation of multimedia technology, a new technology, penetrating deeply into all levels of society, the current education ecosystem will usher in a huge historic change. However, the course of medical imaging is abstract and requires a long time and many times of practice, so it is better to cooperate with multimedia technology for teaching. Based on this, the author of this paper discusses the practice of integrating multimedia technology in medical imaging teaching.

Keywords: Medical Imaging Teaching, Multimedia Technology, Integration, Practice

1. Introduction

Traditional medical imaging courses are mainly taught, and most of the experimental items in medical imaging practice teaching are high investment, high risk and difficult to achieve the teaching mode. High investment of medical imaging equipment: including X-ray equipment, ultrasound equipment, magnetic resonance equipment, CT equipment, etc. Most of the imaging equipment used for teaching in medical schools was eliminated from hospitals. Due to aging and obsolescence, these devices can only be used to explain basic equipment principles and image technology placement, etc., and students cannot get access to more high-end image post-processing parts. At present, imaging equipment is increasingly intelligent and updated frequently [1]. Clinical equipment is not suitable for principle teaching because of its large volume and high price, limited number of sets and large system, and limited use conditions. For example, when interns just beginning to use MRI equipment, they usually "memorize" the process in their mind with the help of plane and book materials, and cannot deeply perceive the working principle and internal structure of magnets.

2. The development trend and characteristics of medical imaging

Medical imaging, as an independent subject, has its own characteristics. It is based on image, which determines that students should face a large number of pictures and image materials in the teaching
process and learn relevant knowledge. Such as CT、MRI and x line, but also to master some clinical common diseases and frequent diseases. With the full coverage of electronic information technology, the traditional teaching methods with blackboard as the main way have been gradually eliminated. With the advantage of convenient, quick and intuitive image, multimedia can perfect the subject teaching system of medical imaging, accord with the teaching characteristics of modern medical imaging, and become an important means to improve the teaching efficiency of medical imaging.

3. The advantages of integrated multimedia technology in medical imaging teaching

![Figure 1. Advantage analysis](image)

3.1. Transforming the present situation of medical imaging teaching

The content of medical image teaching is obscure and abstract. If the traditional teaching method combining language description and picture display is adopted in the teaching process, it will increase the difficulty of students' understanding of the teaching content and make the classroom teaching atmosphere boring and dull [2]. The multimedia technology integrates the visual and listening functions, which can show the medical image to change the present situation of medical image teaching, make the teaching content vivid and easy for students to understand and remember.

3.2. Enriching medical imaging teaching resources

Multimedia technology is the product of the development of information age. In hospital image teaching, teachers can collect clinical cases of major hospitals with the help of multimedia technology, which greatly improves the quantity and quality of teaching cases. Solve the problem of shortage of resources for individual teaching projects. For example, if medical school is located in the Central Plains, it will rarely see regional common diseases such as hepatic hydatid disease in Northwest China, and teachers can collect real clinical cases of hospitals in Northwest China by using multimedia technology to meet the learning needs of students.

3.3. Creating an interactive learning environment
Multimedia technology can create interactive learning environment for students, make students strengthen information exchange and improve the efficiency of students' learning medical image knowledge. For example, when teaching cardiac x line photography anatomy, teachers can use multimedia technology to change the orientation of anatomical images, so that students can quickly understand abstract teaching content [3]. Moreover, teachers can convert clinical x line and CT，MRI basic technology into software programs for multimedia display, so that students can complete the basic operation of medical image examination by operating these software on the computer, which is helpful for students to closely link theory with practical operation and improve learning efficiency.

4. Shortcomings of multimedia teaching

First, some teachers often ignore the cultivation of students' practical ability after applying multimedia technology to teaching. We all know that medical imaging is a highly practical course, and practice is an indispensable link. Students need to improve their ability to read films in practice and combine them with practical clinical work under the guidance of teachers. Many teachers make multimedia p in the form of slides, such as CT or MRI images. It is necessary to know that multimedia teaching means are not omnipotent. In the actual teaching process, teachers can not be bound by multimedia teaching technology to their own teaching thinking. Teachers can not position themselves as multimedia operators and make multimedia the main body of teaching. Teachers should realize that multimedia teaching is only an auxiliary tool of teaching, and a large number of cases of hospital beds are presented on multimedia teaching equipment as a supplement to teaching [4,5]. Teachers blindly use multimedia courseware, but ignore the promotion of their own teaching means and the expansion of medical knowledge, which will eventually lead to the teaching means too dependent on multimedia technology and lose the role of teachers as the guide of students.

Second, multimedia courseware content needs to be updated and modified. It is not difficult to find that some teachers use teaching cattle repeatedly because of laziness in teaching, but in fact, the multimedia courseware needs to adjust its depth and breadth according to the students' specific situation and teaching content. In addition, the current medical image inspection technology is developing and updating rapidly, especially the application of multi-layer spiral and high field MRI inspection equipment. Even today, many teachers do not form reasonable and changeable means when using multimedia courseware, but simply reproduce the text and charts in textbooks by multimedia. This form is only a simple transmission of information for the teaching of medical imaging technology. Students do not understand the knowledge of teaching and do not give full play to the advanced nature of multimedia teaching.

5. Analysis of the role of multimedia teaching in modern medical imaging technology

5.1. Multimedia teaching can change the way of teaching

In the classroom of traditional modern medical imaging technology teaching, teachers do not form a variety of means in the way of transmitting teaching information, and still use the teaching method of oral teaching. This teaching method has no strong appeal, and students do not combine with actual teaching cases in the process of learning. This causes the student's study mood to be hit, the thought ability is restricted. Multimedia teaching method is a teaching method using pictures, sounds and videos [6]. This teaching method can bring teaching cases, basic operation technology and image post-
processing technology into the classroom of modern medical image technology teaching. Students not only receive teaching knowledge better in the process of learning, but also stimulate their own enthusiasm for learning.

5.2. **Multimedia teaching can collect a large number of teaching cases, which is beneficial to students' operation**

Multimedia teaching is based on the premise of computer technology. Therefore, in the actual teaching, the teaching cases mostly come from the imaging data of clinical real cases in major hospitals, and the quantity and quality are further improved. Moreover, by means of modern computer, the boring clinical x line and CT, MRI basic technology are transformed into software equipment, so that students can operate directly with man-machine interaction on the computer, and simulate the basic operation of image examination in hospital, which improves the students' initiative in learning.

6. **Practical strategies of integrating multimedia technology in medical imaging teaching**

![Diagram](Image)

**Figure 2.** Practical strategies

6.1. **Establishment of multimedia teaching resource database**

In order to realize the high integration of medical image education and multimedia technology, further expand the multimedia teaching resources and improve the efficiency of medical image teaching, the
school should establish a multimedia teaching resource database. In the database, teachers' multimedia teaching courseware, new characteristic cases, images of various diseases and so on should be collected. When making multimedia courseware, teachers can collect relevant teaching resources in the database according to the teaching content, insert them into the courseware, enrich the classroom teaching content, and make students come into contact with more and updated medical imaging technology [7-9]. For example, in medical imaging teaching, according to the development trend of medical technology, teachers can add new technologies such as MRI function imaging and perfusion imaging to human multimedia teaching courseware to ensure the advanced nature and practicability of medical imaging teaching content.

6.2. Improving the quality of multimedia courseware making

Teachers can use Photoshop, PowerPoint and other software tools to choose light dark background pictures to avoid visual fatigue. Teachers should arrange all kinds of teaching materials reasonably according to the teaching content to ensure that the physical images in multimedia courseware are clear, the text is concise and concise, and the length of animation video is moderate. Teachers should add dynamic medical images related to pathology, anatomy and diagnostics to the courseware to enhance the reality of teaching content and avoid the courseware becoming a refined replica of textbook knowledge and images [10]. At the same time, when making multimedia courseware, teachers must make clear teaching objectives and teaching ideas, optimize the order of courseware, and ensure that the content of courseware is convenient for students to quickly master the key knowledge of medical image teaching. Help students accumulate more graphic and text information and improve students' learning efficiency.

6.3. Combining traditional teaching with multimedia teaching

When using multimedia technology to carry out medical image teaching, teachers should combine traditional teaching methods to give full play to the integration advantages of traditional teaching and multimedia teaching. When the teacher plays the multimedia courseware, he requires the students to record the important text content in the class piece, so that the students can combine the text with the vivid image, and deepen the students' understanding of the theoretical knowledge. In view of the key and difficult teaching contents, the teacher should slow down the speed of turning over the film, demonstrate the multimedia courseware of the corresponding part repeatedly, make the abstract concept concrete, and guide the students to make clear the key points of study by asking questions. In view of the non-key teaching content, the teacher can speed up the turning speed appropriately.

6.4. Using heuristic teaching methods

In the multimedia teaching of medical imaging, teachers can use heuristic teaching method to make multimedia teaching achieve twice the result with half the effort. When teaching about the content of CT, MR equipment imaging system, teachers can make multimedia video, demonstrate the imaging principle of medical imaging equipment with multimedia video, and the process of image formation of x line [11,12]. Deepen students' understanding of abstract knowledge. In this process, teachers can ask questions, let students combine the resource information in multimedia courseware, discuss and solve problems together, improve students' ability to deal with information, and make students master the method of autonomous learning.
6.5. Teachers should do a good job in preparing lessons before class

First of all, teachers should collect data and collect images to enrich the content of courseware making, rely on the standard of syllabus, select representative pictures from college teaching resources or network, scan images through scanners, and apply software to make necessary post-processing, adjust capacity and attributes to ensure the best visual effect. Secondly, teachers should treat the production of multimedia teaching courseware carefully, such as using different templates for Power-point, with standard interface, organically combining the collected pictures and videos with the content and text, and enriching the students' teaching methods. Finally, the multimedia storage medium function is used to save the courseware, and the multimedia classroom LCD projector is used to play the display courseware.

6.6. Coordinate the relationship between traditional teaching methods and multimedia teaching

If teachers pay too much attention to formal application problems in the process of application, they will ignore the emphasis of many teaching. Multimedia teaching means and traditional teaching methods should complement each other, promote each other and develop each other. For example, the extension of medical knowledge in the teaching classroom can adopt the traditional teaching means, and the deep analysis of the core problems should be carried out by multimedia teaching means. For example, the analysis of some theoretical knowledge of imaging: patients with cardiac enlargement, the first to determine whether they have cardiac enlargement problem, is mild, moderate or severe? Which heart type? Is it the heart or the lung blood? What are the common and abnormal manifestations of atrioventricular enlargement? Wait. With regard to the deep expansion of the same type of questions, teachers can use multimedia drawing to sort out the outline of questions for students, step by step to ask and answer questions, in order to truly master the key knowledge and facilitate memory.

6.7. Using multimedia to create group tasks for students

The process of medical treatment is a cooperative process. In addition to mastering solid medical knowledge, students should also have the ability of unity and cooperation. Therefore, teachers can apply the task method of group cooperation in class, so that students can discuss a typical problem under the guidance of teachers and make a diagnosis and treatment plan. For example, one group completes the selective imaging test assigned by the teacher, the other group completes the analytical test, and the students cooperate with each other and work together to analyze the imaging signs displayed by the teacher's multimedia. The other group integrates the contents of the first two groups to analyze and conclude the diagnosis of imaging signs. In the whole task cooperation, teachers need to put forward certain requirements, such as students must complete in a certain time, students should have integrity according to the idea of image analysis, and the results of analysis and diagnosis must be correct [13]. The last group was responsible for the differential diagnosis of the results of the first three groups, such as testing whether the imaging signs of the patients were consistent with their clinical symptoms. Although it takes the form of group cooperation, it ensures that every student can add people to the learning task of analyzing imaging signs and understand some typical cases under the guidance of teachers from beginning to end. In this process, multimedia is not only the carrier of teachers' release tasks and students' reference, but also the platform for students to show the results of discussion according to the disease analysis of knowledge and the content of imaging, which is convenient to operate and greatly improves the efficiency of classroom teaching.
7. Conclusion

In a word, traditional medical imaging courses are mainly taught, and most experimental projects in medical imaging practice teaching are high investment, high risk and difficult to achieve the teaching mode. High investment of medical imaging equipment: including X-ray equipment, ultrasound equipment, magnetic resonance equipment, CT equipment, etc. Most of the imaging equipment used for teaching in medical schools was eliminated from hospitals. Due to aging and obsolescence, these devices can only be used to explain basic equipment principles and image technology placement, etc., and students cannot get access to more high-end image post-processing parts. At present, imaging equipment is increasingly intelligent and updated frequently. Clinical equipment is not suitable for principle teaching because of its large volume and high price, limited number of sets and large system, and limited use conditions. Has just started, for example, an intern in the equipment used by MRI, mostly with the help of a plane and books information in mind "memorize" process, the working principle of the magnet and the internal structure cannot depth perception, so medical imaging teaching must attach importance to the application of multimedia technology, with the development of multimedia technology and in depth in the field of health care, "multimedia + education" new patterns are emerging, the innovation of teaching mode for medical imaging has brought limitless possibilities.

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