The Curriculum Reform Practice of Clinical Microbiology Testing Technology Based on Network Teaching Platform

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Abstract: in Order to Stimulate the Students of Medical Test Technology to Learn Interest in the Experimental Course of "Microbiology and Testing Technology", Train Experimental Skills, Expand Innovative Thinking, and Promote Quality Education, We Explored the Online Course Teaching Method Based on the Network Platform in the Experimental Class of the Course Application. Practice Has Proved That the Online Course Teaching Method Can Effectively Improve the Degree of Preference of Medical Test Technology Students to the Course, and is Conducive to Students to Improve Their Academic Performance, and Effectively Enhance Students' Attention to the Frontier Knowledge of the Subject.

1. Introduction

Since the 21st Century, in the Field of Clinical Microbiology Testing, Both Domestic Exchanges and International Exchanges Have Increased Year by Year. a Number of Very Advanced Instruments and Equipment, and Highly Specialized Clinical Microbiological Inspectors Have Jointly Improved the Clinical Microbiological Examination [1]. However, There Are Still Some Problems and the Quality of Clinical Microbiological Tests Has Been Greatly Affected.

2. Overview of Clinical Microbiological Testing Technology Courses

2.1 Course Goal Design

First, the knowledge goal refers to allowing students to understand the relationship between microbes and the clinical industry while mastering the basic concepts of clinical microbiology and structural forms. Second, the ability goal is to equip students with basic operational testing techniques such as separation and cultivation of microorganisms, as well as the necessary skills for applying useful microbes, controlling and testing harmful microorganisms in clinical processing [1]. Third, the emotional goal is to require the inspectors to be meticulous in their work attitude and scientific and rigorous in their work style in order to cope with the cumbersome and time-consuming clinical microbiological testing work. Therefore, it is necessary to focus on cultivating students' professionalism and teamwork ability.

2.2 Course Content Design

The course content of education is designed based on the knowledge and skills requirements of the company and the certification requirements of the country. It is divided into the observation of basic forms of microorganisms, the staining and morphological observation of bacteria, the preparation and sterilization of culture media, and the microbial separation and culture, determination of total number of colonies in clinical hygiene microbiological testing techniques, examination of coliforms, determination of lactic acid bacteria, determination of clinical aflatoxins, and determination of common pathogenic bacteria in clinical practice [2].

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2.3 Method and Means of Course Teaching

The teaching methods include two aspects: intra-school teaching internship and off-campus post-internship. Specifically, in the school teaching, group training, multimedia teaching, case discussion, role playing, and troubleshooting are used for teaching. The comprehensive professional ability to achieve the consistency of students' classroom teaching and professional needs [3].

3. The Main Problems in the Teaching of Clinical Microbiology Test

3.1 Guiding Ideology Does Not Meet the Requirements of Cultivating Students' Practical Ability

The purpose of traditional clinical microbiology testing experiments is to strengthen students' understanding and mastery of relevant theoretical knowledge, but neglects the cultivation of students' hands-on and innovation ability, and can not stimulate students' interest in professional learning, and often in practical teaching. Demonstration and verification experiments are the main ones, but there are few comprehensive, design and research experiments [4].

3.2 The Textbook Content is Updated Slowly

The existing theoretical results for microbiological testing are very rich, and the standards and norms developed at the national level are more in line with the existing research situation [2]. However, the teaching level has not been able to follow up, the lag of the teaching content, the detailed explanation and explanation of the actual operation part of the experiment are difficult to understand, and the existing teaching materials are more and more difficult to adapt to the current development trend.

3.3 Teaching Methods Ignore the Enthusiasm of Student Participation

In the traditional clinical microbiology testing teaching, the teacher's explanation is always the main task. The students simply reproduce the experimental materials and utensils prepared by the teacher according to the theory and the strict stipulations in the teaching materials. process. In the case of simulation theory first, the experiment is completed, and repeated, complicated and identical experimental reports are submitted [3]. During the design, implementation, and testing phases of the experiment, students were seriously lacking in participation, which spurred the enthusiasm of most students. After the experimental class, the students did not understand the experimental procedures, instruments, materials and other conditions due to lack of participation.

3.4 Collection of Microbial Specimens is Not Standardized

As is well known, specimens are the basis of clinical microbiological testing, and are also collected by the collectors of microbial testing work. But the prevailing phenomenon is that the laboratory lacks communication with the clinical aspect or even communication. The direct result is that the collector does not have a deep understanding of the timing of the acquisition, the location of the acquisition, the amount collected, and the specific considerations for the acquisition. After a large number of specimens were collected, they were actually unqualified. This results in the detection rate of pathogenic bacteria is often severely low, in the actual clinical treatment process, caused a large error, leading to many serious consequences [4]. In many hospitals in China, there is not even a clear provision for all kinds of precautions for collecting specimens. For example, sometimes patients may have anaerobic infections, but medical staff use cotton swabs to sample, and so on. It is then difficult for the laboratory to make the right results in this situation.

3.5 The Storage of Microbial Specimens is Not Standardized

We all know that the preservation and delivery of microbial specimens is based on maintaining the vitality of pathogens. It is necessary to avoid the contamination of pathogens and to prevent their excessive reproduction. Because different pathogens have different characteristics, there are different

requirements in the process of storage and transportation. For example, in the summer, the patient's urine or feces are cultured in bacteria. The direct result is missed diagnosis or even misdiagnosis. Furthermore, Neisseria gonorrhoeae and Neisseria meningitidis are very sensitive to cold conditions, which requires transportation at room temperature, especially in winter [5]. However, in the actual operation process, many units do not pay attention to this, or even do not understand.

3.6 Insufficient Communication between Microbiological Inspectors and the Clinic

We all know that clinical diagnosis and treatment with microbes have a very close relationship. Clinicians and microbiology workers need to communicate in a timely manner and communicate frequently to ensure efficient and accurate work. However, in actual work, clinicians in a large number of hospitals rarely communicate with microbial workers, whether subjectively neglected or objectively busy. This frequently leads to many serious consequences. Many small omissions are directly related to the patient's life and death [5].

4. Application Value of Online Classroom in Clinical Microbiology Testing Technology Teaching

4.1 Changing the Traditional Experimental Teaching Concept and Experimental Teaching Mode

The online classroom reorganized the teaching process and changed the traditional experimental teaching concepts and methods that we are accustomed to. It is the adjustment and transformation of the classroom teaching focus and teaching methods, and also a bold attempt to adapt to highly developed information technology [6]. Because this teaching mode uses a variety of visual and attractive teaching methods such as watching video clips (micro-courses, micro-courses, etc.), online learning, teacher-student interaction, etc., using self-learning, class discussion, task-driven, etc. The teaching method of the form, the teaching content is fragmented and interesting, the teaching process is reasonable, the teaching objectives are clear and targeted, and it conforms to the cognitive rules and interest characteristics of the higher vocational students.

4.2 Give Full Play to the Student's Main Position and Improve Students' Practical Operation Skills and Comprehensive Ability

In the pre-class session of the online classroom, students can watch video clips (micro-courses, micro-courses, etc.) on their own, and then complete specific task tickets. In the hands-on practice of the online classroom, the students have learned and discussed the key points and steps of the experiment before the class, and have clear and clear understanding of the experimental precautions and the results of the experiment. The purpose of the operation is stronger, and the experimental operation time is more abundant. The practice teaching process based on the concept of online classroom conforms to the learning habits and characteristics of higher vocational students. It is not only the process of students' independent inquiry and learning, but also the process of students asking questions, analyzing and solving problems, and cooperative learning, effectively improving students' practical ability and analyze the ability to solve problems [6].

4.3 Enhancing the Teaching Level of Teachers and Promoting the Professional Growth of Teachers

Under the teaching mode of the online classroom, teachers should change the inherent teaching concepts, learn new knowledge, new skills, new teaching methods, extensively collect and accumulate materials, carefully prepare video short films (micro-courses, micro-courses, etc.) resources, pay attention to the quality of video short films [7]. And timely sum up and summarize, constantly improve and optimize this teaching mode, gradually exercise and improve their practical teaching ability and professional quality, and truly use the online classroom to help students fully grasp the key skills of the experiment.

5. The Application of Online Classroom in the Teaching of Clinical Microbiological Testing Technology

With the rapid development of network technology and the popularization of mobile terminals, new media represented by WeChat has led to changes in the way people learn [1]. In order to adapt to the new learning media and methods in the micro-era, the curriculum resources with the micro-course teaching video as the main carrier have attracted attention with the knowledge point [7]. “Microbiology and testing technology” is an important professional course in medical laboratory technology. It is the main task of the course to let students master the basic theory and testing technology. The course is characterized by a large proportion of experimental courses, accounting for 45% of the entire course time, and undertakes important tasks of deepening theoretical knowledge, cultivating operational skills and clinical analysis capabilities, directly affecting the teaching effect. Traditional teaching is limited by teaching time and teaching tasks. Students often cannot actively think about the purpose and principle of experiments, but only mechanical imitation and task-dependent thinking. The lack of teaching interaction is not conducive to students' consolidation of knowledge and the cultivation of independent learning ability [8], as shown in Table 1.

Table 1 the Use of Wechat and the Needs of the Wechat Learning Platform for the Students of the Medical Laboratory

Grouping	Use WeChat every day and look at information (%)	Always pay attention to the WeChat public number (%)	Hope to learn Microbiology and Examination Technology through WeChat (%)
(n=60) The group that was ready to learn (n=60)	100	85.0	90.0
(n=61) The group that has finished learning (n=61)	100	86.9	91.8
χ^2	0.135	0.089	0.119
P	0.509	0.485	0.488

5.1 Preparation of Teachers' Teaching Resources Before Class and Students' Self-Learning Stage

The preparation stage of the teacher's teaching resources. Teachers should determine the teaching content and objectives according to the curriculum teaching plan and experimental project requirements, combined with the knowledge structure and learning ability of higher vocational students, design teaching tasks, and break down the content into several major knowledge points or skill points, and make corresponding [7]. The use of the online course platform is flexible according to the actual situation and the characteristics of the course. The content of teaching video clips (micro-courses, micro-courses, etc.) should be accurate and clear, short and concise, rich and interesting. For example, the structure and use technology of the microscope, the use technology of the high-pressure steam sterilizer, etc. are made into knowledge points or skill points, and the simplified and intuitive micro-curricular resources are uploaded to the platform of the blue ink cloud class for students to watch and learn.

5.2 Classroom Experiment Implementation Phase

On the basis of the first stage, the students conduct the experimental operation according to the completed task list. The teacher carefully observes the student's experimental process, and combines the problems in the classroom discussion to guide the students in real time. In the course of the experiment, students are allowed to record the operation video while operating in groups [8]. Before the end of the experimental teaching class, we will focus on explaining the places where students operate irregularly, summarizing and evaluating this experimental class, commending and affirming the students' performance, identifying the deficiencies and suggesting improvements, and strengthening the self-learning and classroom before class.

5.3 Post-Experimental Evaluation and Reflection of New Tasks

After the experiment, the students will edit and record the recorded video in the class. The teacher will watch the submitted video and summarize the new problems such as operational errors and irregularities in the experimental stage, and form a written material to feedback to the students in time; The experimental teaching process is evaluated and reflected, and gradually adjusted and improved [7]. Then assign new tasks to the students, such as editing the previously recorded videos according to the teacher's feedback, and setting up the self-learning tasks before the class in the next lab class to promote the consolidation and expansion of knowledge.

6. Summary

For the testing of clinical microorganisms, we are committed to improving the level and controlling the quality. But it must start with strict implementation of the details. Whether it is a variety of operational procedures, transport and preservation work, or clinical aspects of microbiological testing, is the current pain point in the field of clinical microbiological testing. We must have a clear understanding of the significance of clinical microbiological testing, which requires the continued joint efforts of all staff in the field.

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