Practice and Exploration of MOOC Mode in Medical Laboratory Teaching

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Abstract. The requirements of "technology as the main line, vocational skills as the guidance" are particularly prominent. The Massive Open Online Course is a new teaching mode in recent years, which has become the focus of the world. In this paper, we discuss the application of MOOC in medical laboratory teaching. Taking clinical biochemistry laboratory technology as an example, we introduce online MOOC teaching video, carry out offline classes, and establish interactive evaluation and feedback system in teaching, which is helpful to change teachers' functions, improve learners' independent learning ability, think independently, analyze and solve problems, cooperate in teams, and communicate Ability to coordinate with others.

Current Situation and Problems of Medical Laboratory Teaching

In 2012, the Ministry of education adjusted the structure of medical laboratory undergraduate major, changed the name of the major from medical laboratory to medical laboratory technology, changed the length of schooling from five-year system to four-year system, and changed the degree from medical degree to science degree. The training mode of medical laboratory undergraduate major changed greatly [1, 2]. Under the background of "five changes and four changes," the new professional requirements of "technology as the main line and vocational skills as the guidance" are particularly prominent. The education of medical laboratory specialty is skill teaching, and students' operation ability is an important part of medical learning. Therefore, the practice operation runs through the whole medical teaching process. Only through a certain amount of practice can students obtain the necessary comprehensive skills. However, due to the influence of ethics, practice conditions, practice costs and resources, students often lack the practical and practical ability, resulting in the lack of clinical thinking, professional skills and other problems. In the teaching of medical laboratory, the common problem is that students do not have a deep understanding of knowledge points and some abstract problems are difficult to understand. The main reason is that the contents involved in the professional courses of medical laboratory are abstract, extensive, and the theory is boring. It is difficult to stimulate students' interest in learning and it is not conducive to a students' thorough understanding of knowledge [3]. It is an important goal of medical laboratory teaching reform to improve the quality of classroom teaching and stimulate students' interest in learning. With the progress of the times and the development of information technology, the traditional teaching mode has been unable to respond to the requirements of the times.

Massive Open Online Course

Massive Open Online Course (MOOC) is a large-scale open online course. MOOC is a new educational model developed from the United States in 2011. MOOC is characterized by openness, autonomy and large scale. Openness means that the course is open to the public, and learners are not restricted by learning basis and region. Learners can learn the course independently as long as they can connect to the Internet. At the same time, MOOC course has no limit on the number of participants, and can accommodate tens of thousands of people to study a course at the same time. Therefore, it has the characteristics of large-scale.

The research of MOOC in biochemistry teaching and reform is at the exploratory stage [4, 5]. Along with the progress of Internet technology and the improvement of network popularity, MOOC
has developed rapidly. The rise of MOOC attracts the attention of many students. How to use the limited classroom teaching time to teach knowledge well, thoroughly and successfully has become a major problem for medical laboratory teachers.

How to provide more future medical workers with systematic and complete clinical medical education is an increasingly serious problem [6]. According to Matthew Howe [7] and Richard Heller [8], MOOC is more suitable for continuing education courses of clinical medicine, because doctors can learn fields of interest at any time, and learn and update knowledge conveniently, timely and quickly [9]. Therefore, how to carry out the reform of medical laboratory education to meet the needs of today's medical education is an urgent problem for medical educators. This paper discusses how to use MOOC resources for medical laboratory education.

The Design and Practice of MOOC Model Applied in Medical Laboratory Teaching

The author chooses the course "Clinical Biochemistry Testing Technology" as the pilot, and designs three specific modules under the guidance of MOOC mode, which are online learning, offline discussion and evaluation system. In this study, "Clinical Biochemistry Testing Technology" course was chosen as the pilot, and three specific modules were designed under the guidance of MOOC mode, which are online learning, offline discussion and evaluation system. Based on the online course platform of Qiqihar Medical University, online learning and offline learning are combined to deepen students' understanding and memory of knowledge, improve classroom efficiency, and improve the teaching quality of Clinical Biochemistry Testing Technology. At the same time, it summarizes the advantages and disadvantages and studies the specific implementation path, in order to provide reference for the medical laboratory teaching to comprehensively promote the MOOC teaching mode.

Online Course Preparation

Making teaching courseware again to enhance the attraction of classroom teaching. In the era of MOOC, it is necessary to fully understand what purpose teachers should use network courseware to achieve, what problems should be solved in teaching, what mode should be adopted, and the following questions can be raised: how to achieve the training in knowledge and skills? What are the key and difficult points of teaching content and how to express them? Why can't the traditional teaching method be solved? How to solve the problems that traditional teaching can't solve by using computer? The teaching software should be more precise, with vivid pictures and highly intelligent operation, which will arouse students' interest in learning and help them master the classroom knowledge.

The research content of "Clinical Biochemistry Testing Technology" is relatively abstract and complex, and there are many knowledge points. The traditional teaching method often makes people difficult to understand and remember. Computer multimedia technology integrates words, images, sounds and animations, and provides students with a vivid and lifelike teaching environment, which makes the abstract and difficult to understand micro life process concrete, enhances the teaching appeal and the inherent charm of the teaching content, thus arousing the initiative and enthusiasm of students. Taking the biochemistry test of learning glucose metabolism as an example, according to the requirements of the syllabus, the teacher formulates the content to be narrated, including the division of sections, knowledge points and links. Generally, flash is chosen as the animation tool of network courseware, such as animation to simulate the operation process of "fasting blood glucose detection," "glucose tolerance test," etc. The system of text explanation is also provided during the production. The amount of text is not less than the content of undergraduate teaching materials. The important words in the text provide corresponding English words, such as glycosylated hemoglobin.

As the detection of lipoproteins is a routine item in clinical examination, it has high utilization rate, many kinds of indexes, abstract teaching content, incomplete supporting practice teaching and great difficulty in teaching. Therefore, in this chapter, the online and offline teaching mode is adopted, and the online teaching platform is used to upload the segmented video of lipoprotein
detection, which is open to students for learning; the form of case analysis questions is the focus of online assessment.

Set up tasks for the MOOC class, publish the "task list," guide students to complete the set of teaching tasks within the specified time, According to the "task list," students watch the video, participate in online Q & A, discussion and other links, to test the learning effect, and find problems and feedback problems in time.

**Students' Preparation before Class**

First of all, students log in to the network platform with student number and password, complete the questionnaire, watch online video and complete the homework; second, teachers know the knowledge points and existing problems of students through the questionnaire and course homework statistics, and group the students’ offline to discuss and complete the course task together on the difficult points.

**Classroom Internalization**

In the offline classroom, on the one hand, teachers answer questions and solve problems according to students' questionnaire feedback, data analysis and questions raised in the online platform course exchange and discussion area; problems found by students in the pre class preparation stage are solved in the internalization stage in the classroom. There are various ways to solve problems, such as teachers and students learning together, teachers answering questions, completing homework, group discussion in class, in-depth collaborative exploration, etc. Problem solving itself is a process of learning and communication. Key and difficult problems can be explored to make students fully participate in it, and students can complete it by independent exploration or group cooperation, that is, with the help of teachers, students can actively complete the internalization of knowledge.

**Class Evaluation**

Evaluation after class is an important part of MOOC model application. The main task is to help students evaluate what they have learned and promote the internalization and solidification of knowledge. The main operating procedures are:

(1) In the post-school consolidation stage, teachers make comments and summaries according to the teaching situation of each class, and release excellent learning resources such as exercises and review outlines to the network platform for students to review after class. At the same time, the course related cutting-edge knowledge will be released to the network for students with special needs to expand and improve. At any time to confirm students' mastery of knowledge points and evaluation of teaching effect. Teachers release assessment tasks online for testing; students complete online course assessment and submit it as required. The teacher's real-time correction, and then a certain proportion of the total final score of the course.

(2) Students' evaluation of teaching and teachers' evaluation of learning evaluate the teaching effect from the two aspects of guide and learners [5]. Students can exchange learning experience and participate in teaching feedback at any time in MOOC platform system, which is conducive to students' self-regulation, improvement of learning efficiency and consolidation of learned knowledge. Teachers can take online course participation (students' login time, enthusiasm for communication and discussion, frequency and value of uploading resources) and online and offline evaluation results as the basis for considering students' learning situation, and promote from a single traditional evaluation to a multi-dimensional comprehensive evaluation of students' learning ability and learning effect. Through the analysis of the questionnaire and the final examination papers, it is concluded that whether the flipped classroom teaching mode based on MOOC can effectively improve students' interest in learning, help students to understand the key points and difficulties of the learning content in a comprehensive way, improve the ability of learning summary and induction, and improve their academic performance.
Summary

The influence of Internet on education is far-reaching, and it is an educational revolution. With the development of network broadband technology, there are various terminals. The mobile teaching method based on "wireless network + handheld terminal school" has been put into practice. MOOC's teaching method mostly adopts "traditional classroom + online teaching" hybrid teaching. This kind of learning mode pays attention to the importance and necessity of the interaction between teachers and students, respects the subjectivity of students, and students' online learning and face-to-face communication with teachers on a subject offline is a process of knowledge internalization and sublimation. It can arouse students' enthusiasm for learning, stimulate their interest in learning, deepen their understanding of knowledge, improve the ability of combining basic teaching knowledge with comprehensive practice, and improve the efficiency of classroom teaching with student-oriented teaching mode, thus improving the teaching quality of medical laboratory professional courses.

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