The Application Effect of a Massive Open Online Course in Pathogen Biology

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Abstract. 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 role of Massive Open Online Course in the course of pathogen biology according to teaching content, concept, mechanism, understanding of theoretical knowledge and poor memory, etc.

First, Massive Open Online Course

MOOC(Massive Open Online Course), a large-scale open online course, literally translated as Mu-class. The concept of MOOC was first proposed in 2008 by Canadian scholar Dave Cormier and Bryan Alexander. By 2012 MOOC had made a breakthrough and formed three major platforms: Coursera, ed X and Udacity, so the year was named "the first year of admiring MOOC" by the New York Times due to the hypergrowth. MOOC was given great impetus to promote the reform of teaching methods in colleges and universities and change the traditional mode of education. Undoubtedly, traditional higher education begins to face new challenges and opportunities. An article in the magazine National Interest magazine in the United States even predicts that MOOC will overthrow the existing higher education. Over the next few decades, more than 4, 000 U. S. universities will be disappear in half[1].

As a "large-scale open network course", MOOC aims to "bring the best educational resources in the world to the remotest corners of the earth", which poses a severe test for traditional university education. How to foster a better footing in the teaching trend of MOOC to the non-first-class universities is the thinking orientation among the teachers[2].

In March 2014, the first medical education alliance-China Medical Education MOOC Alliance was established. It covers almost all medical institutions in China. Its goal is to achieve the most extensive sharing of quality teaching resources on the internet platform through the platform of Chinese medicine education and quality courses, and to cultivate excellent medical and health talents for the motherland by the integration of medical education in schools[3].

Unlike traditional distance education including television, radio and telecommunications, MOOC has its origins in web-based distance education and video courses. It has such basic features as high degree of openness, repeatatability and emphasis on learning experience and interaction[4]. Online teachers to teach the curriculum, the students learning experience and the interaction between teachers and students can be implemented completely and systematically by MOOC[5].

Second, the Pathogen Biology

Pathogen biology is a science that studies the biological etiology or pathogen biology in human diseases. It is formed by the merger of medical microbiology and human parasitology according to the instruction of the Degree Office of the State Council[6]. The research contents include the biological characters, pathogenicity, immunity, microbiological examination and prevention and cure
principles of disease-related pathogens. It is a basic medicine course which is very important to connect preclinical medicine and clinical medicine, and be related closely to immunology, molecular biology, internal and external medicine, infectious diseases and other disciplines. It is the main course to the medical students.

Pathogens can cause a wide range of infectious diseases and pose a serious threat to human health. According to the World Health Organization, in recent years, more than 17 million people die of infectious diseases globally every year. In recent 20 years, nearly 30 new pathogens have been reported to can cause various diseases such as Ebola virus, HIV and various new hepatitis viruses and so on. In addition, there are some signs of resurgence of infectious diseases that have been well controlled in the past, such as tuberculosis and dengue fever. Pathobiology is a long way from being a basic medical course that studies the prevalence and control of the causes of infectious and communicable diseases and their associated diseases.

In order to adapt to the characteristics of pathogenic biology courses, fully mobilize the enthusiasm, initiative and creativity, better cultivating students' self-learning ability and the ability to analyze and solve problems independently, it is imperative to reform the teaching methods of pathogen biology. According to the characteristics of different teaching contents, different teaching methods are adopted to simplify complicated problems and visualize the abstract problems. It can help students understand and accept the knowledge they learned and improve teaching efficiency and teaching quality[7].

Third, the Advantages of Application of MOOC in Pathogen Biology Teaching

In 2017, online education had been regarded as an important strategy for school development by Qiqihar Medical University. It built a web-based high-quality resource sharing platform for higher education, promoted the reform of higher education in the era of "Internet+", improved its working mechanism and introduced related policy. Taking this as an opportunity and "school online" as a carrier, the group strengthened the construction of "pathogen biology" online course.

MOOC is a product of the rapid development of educational technology. Although it can help students to learn independently in the classroom, MOOC cannot serve as the main way for students to study because of the huge features of the pathogen biology curriculum. It should be a kind of auxiliary teaching tool. The problems discovered by students during the course of learning MOOC can be solved by interacting with teachers in classroom teaching[8]. Compared with the traditional teaching mode, the advantages of applying MOOC in pathogen biology teaching are as follows:

Break the Traditional Teaching Model, Improve Students’ Ability to Learn Independently.
The traditional teaching of pathogenic biology is that teachers teach theoretical knowledge in the classroom, form a single, limited means, emphasis on commonalities of students, inadequate care of students' personality learning, students often difficult to master a large number of pathogenic biology knowledge in a limited class time. It's hard to develop the students' initiative, creativity and the role of cognitive subject. Although teachers use multimedia and pictures to show their teaching content in class, teachers find it hard to insert large-scale videos, discuss cases or use other teaching methods in the classroom due to the time constraints. So it is likely to result in "full house" style teaching. Similarly, relying solely on a limited time to enable students to recognize a large number of pathogenic microorganisms and parasites in the experimental class, the content is difficult to digest. This is not a very good teaching effect. Moreover, the traditional teaching mode makes the students rely more on the teachers and lacks of the independent learning process, and the teaching effect is not good. MOOC teaching is based on the students own motivation of an efficient teaching. The driving force of students' active learning is a key factor in the success of any teaching form. In the teaching of pathogenic biology, students also need to fully mobilize the internal drive.

In MOOC, teachers can break the chapter-by-section which belong to the traditional teaching mode, and focus on the knowledge points. Although the teaching videos are still presented, each video is more condensed on the knowledge points than the larger chapters. In addition, MOOC are often presented in a variety of modes. Various teaching methods are designed around the memory of students.
a knowledge point. The related content is presented to students by texts, pictures, audio, videos, cases and the like. With abundant teaching tools, to seize the attention of students, improve the students interest in learning and motivation, greatly improving learning efficiency.

Break the One-to-many Interactive Mode, Enhance the Efficiency of Problem Solving. Less interactive discussion and more theory of knowledge is instilled in traditional teaching. Combining the MOOC with the traditional classroom teaching can save the time in the classroom, reduce the cost of teaching and increase effectiveness[9]. Although teachers and students can interact face-to-face in traditional classrooms, it is difficult to solve all the student's problem in limited classroom time. In MOOC, you can collect common questions from students by the Big Data and use software to answer students automatically. At the same time, it is more easily find out the weak points of students by these Big Data for teachers, so it can be more targeted in teaching design to the teachers. In the course of MOOC teaching, you can design many interactive teaching links through computer software, many questions are linked to the knowledge points. such as to design the test questions or cases around a knowledge point, then carry out online class discussions. These discussions are not only confined to the teacher and the students, it be also implement between the students. The discussion between learners to make them more aware of their learning deficiencies. Through a series of interactive sessions such as group discussion, peer review system and student leaders, students can demonstrate what they have learned, mobilize learning enthusiasm and deepen what they have learned. Students’ learning information can better feedback to teachers.

In addition, a variety of advanced teaching methods are used. The contents of the course are presented to students through texts, images, sounds, animations and other information by modern media such as projectors, computers and the Internet and so on. It can stimulate the students’ interest and improve their efficiency. To integrate the traditional classroom teaching and online teaching resources, and establish the teaching website of etiology to focus on course wares, lesson plans, exercises, video materials, science knowledge, epidemic history of epidemics, Nobel Prize in Physiology and Microbiology related knowledge, then to communicate with each other through the forums or e-mail[10].

Break the Limitations of Time and Space, Enhance the Diversity of Teaching Forms. Pathogen biology has a wealth of teaching materials and resources, and actively use advanced information technology tools to help teaching. For example, the morphology and structure of pathogenic microorganism may be presented by using pictures or videos; the life cycle of various parasites may be displayed through animations or schematic diagrams. MOOC learning is mainly done online, not subject to geographical and time constraints. The students can arrange their own learning based on the actual time and space. people focus on the effective length of time in about 15 to 20 minutes, MOOC content is usually in accordance with this duration of the video, easy for learners to use debris time for efficient learning. During the video lesson, students can watch the video repeatedly until it is understood, which is almost impossible with face-to-face classrooms.

Break the Basic Disciplines Limit the Ability, Enhance Clinical Applications. Pathogen biology between the preclinical course and the clinical course belong to the bridge course. Students have a keen interest in the clinical application of the discipline. Such as the introduction of influenza virus can combine with bird flu and other impressive public health events. The content may extend to the virus mutation, diagnosis and control, and improve the fun. Closely follow the frontiers of disciplines to broaden their horizons. In recent years, new and emerging microbial infections continue to occur[11], posing a serious threat to human health. For example, the epidemic of SARS in China in 2003 caused huge losses; The global H1N1 influenza in 2009 was still fresh in memory; In 2011 Hemorrhagic E. coli infections are prevalent in European countries and cause global concern; in 2014 Ebola haemorrhagic fever, which mainly occurred in Africa, resulted in the deaths of thousands of people. New progress is highly exploratory and often linked to practical applications, helping to develop students' pragmatic and innovative ideas. To combine practical life with practice. Scientific choice of teaching content, do not have to rely entirely on teaching material according to the scripted. Focus on the common hot issues in life such as hepatitis B, AIDS, hand-foot-mouth disease, malaria, schistosomiasis prevention, diagnosis and treatment, combined with the current status and progress of
scientific research, develop students' horizons. These diseases are also closely related to the health of students and can be learned.

**Fourth, the Conclusion**

The application of MOOC in the teaching of pathogenic biology is the need of the development of the times. These new educational concepts have far-reaching significance for the reform of the teaching of pathogenic biology. It have undergone tremendous changes both teaching methods and teachers 'teaching ideas, which has greatly promoted the enthusiasm and initiative of students, achieved good teaching results and comprehensively enhanced students' autonomous learning ability and knowledge and skills. These abilities will make teachers and teachers students benefit for life.

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**References**


