Teaching Practice of Micro Course of Medical Cell Biology Based on MOOC and SPOC

Wen-Jing YU\textsuperscript{a}, Lian BO\textsuperscript{b}, Chun-Ling ZHAO\textsuperscript{c}, Zhi-Qin GAO\textsuperscript{d,*} and Hong-Xia LI\textsuperscript{e}

School of Bioscience and Technology, Weifang Medical University, China

\textsuperscript{a}wenzi790626@163.com, \textsuperscript{b}lianbo@163.com, \textsuperscript{c}zhaochunlingbj@163.com, \textsuperscript{d}zhiqingao@163.com, \textsuperscript{e}1632788207@qq.com

*corresponding author

Keywords: Cell Biology, MOOC, SPOC, Micro Course.

Abstract. This study discusses the advantage and disadvantage of the online courses applied on the medical cell biology, analyzes the necessity and significance of teaching practice of Micro Course based on MOOC (Massive Open Online Courses) and SPOC (Small Private Online Course). Combined the technology of Micro-courses, MOOC and SPOC, the new teaching method can improve the students' learning efficiency and learning interest. For teachers, it is the most important three things that choose the appropriate knowledge, design and make the micro videos and improve the ability of teaching organization.

Introduction

MOOC (Massive Open Online Courses) is a new type of online learning, liked OCW (Open Course Ware) and OERs (Open Educational Resources). New York Times declared 2012 as the year of the MOOC. It was the year when Udacity, Coursera and edX, the three leading MOOC companies, took the education world by storm and promised a lot [1]. Although many of MOOC's components are still relatively new, MOOC has been one of the most popular online courses for higher education.

SPOC (Small Private Online Course) is proposed by Armando Fox from University of California at Berkeley. Acting as a reduced-scale adoption of a MOOC, SPOC is more effective than MOOCs especially in higher education [2].

The key characteristics of MOOCs are massive, online, open and free. While SPOCs target a specific group of learners, lower the cost of high-quality courses through MOOC's economy of scale, and enjoy the same pedagogical big data from MOOCs.

In China, "Micro-course" or "Micro-lecture" is proposed by Hu Tieshan [3,4]. He thinks the micro course is micro-teaching-video less than 10 minutes, focused on the only one topic according to the new curriculum standard and traditional teaching practice in the classroom. The most prominent feature of the micro-course is the "micro". The "micro" first reflect on the learning time is short. Learners in learning a micro course need not to spend too much time and energy. For each class, it not only shortens the learning time, but also reduces the learning burden and pressure and adapts to the needs of mobile learning.

The Necessity and Significance of Micro Course Teaching Practice on Medical Cell Biology

Cell biology is one of the most active frontier subjects in the 21st century. As an important course in the preclinical medicine, medical cell biology is very important to cultivate medical talents [5]. In recent years, the development of medical cell biology with each passing day, the speed of the knowledge update is very rapid. We will encounter more and more new breakthrough, new theories and Nobel Prize which involved in the research of cell biology when we are teaching cell biology in the
university [6,7]. In the face of the surging development of the discipline of the situation, the traditional teaching concept, teaching methods and teaching means have already cannot adapt to the demands of a new age.

At the same time, online learning has become an increasingly popular option for many students, which shatters the traditional borders of education. So, every student can immediately access many benefits that were previously unavailable to them. With the development of network technology, the application and practice of micro course have spread throughout the world. Many universities have also launched their own micro course video on many different subjects. MOOC provides massive useful online teaching resources about medical cell biology and relative subjects.

The characteristic of cell biology is abstract. The structure of cells and organelles in the cytosol can not to be observed directly by the naked eye. We must use the photos and videos caught by the optical microscope or electron microscope to show the contents to our students and help students establish a more stereo intuitive understanding. Therefore, traditional teaching methods can't ensure that students can easily and flexibly to observe objects, and the teacher's explanation, blackboard and chart form can't give students enough visual imagination.

"MOOCs“ make full use of the advantage of network technology, multimedia technology, even large data analysis technology to show the abstract micro world vividly, bring up students‘ interest in learning, stimulate students seeking knowledge desire for cell biology [8,9]. The teaching mode of MOOC take the well-designed and interesting micro courses videos as the core resources, through the interactive discussion, personalized practice, real-time feedback to improve learners' learning autonomy and interests. In the process of teaching and learning activities of medical cell biology, micro courses supported by MOOC and SPOC will build the benign interaction cycle.

Design and Practice of Micro Courses of Medical Cell Biology

Curriculum design. The difference between the micro course and the simple micro video is systematic curriculum design and related supporting services [10], this requests teachers should fully consider their integrity in the process of designing cell biology micro courses. For example, the teaching contents of medical cell biology can be divided into three sections firstly: the introduction of the cell and cell biology technology; the diverse structure and functions of different cellular organelles; the activities of the living cell (growth, aging, diseases, death and apoptosis). Designers need focus the key characteristics of every organelle to make distinct script in the second and third section. Every teacher who practice and make micro course video should have such a cognitive: one micro video come from a system, just is a node in a vast knowledge system, learner's cannot got all the knowledge system from here, but can get important advice, inspiration, or summary from this.

Teaching design. Medical cell biology, as other basic medical courses, makes students often feel boring. Micro knowledge is not easy to understand, by means of traditional teaching method. It very hard for beginning learners to image the structure and ultrastructure of the cell; to grasp the molecular mechanisms and hypothesis in the cell world and is relatively difficult to recite all knowledge. The important feature of Micro courses is that the teaching contents can be matched with the interpretation of pictures or animation which are made by the professional technologist. It can convert the complex and abstract content to visualize and help students understand the knowledge which is helpful to improve teaching quality. It's very important for every teacher to analyze the structure and characteristics of the teaching contents, choose the most suitable method according this (Table 1).

Design points. The main characteristic of the micro course is: outstanding theme, diverse resources, short, easy to use, plus the half structure and easy to extend. In the process of design and manufacture of micro course, we must grasp the following points: first, the lesson of the title should be accurate, brief, attractive and able to cover the main content of courses, so that students can directly search their interested content or micro course, which can help students make full use of fragmented time to learn;
Second, an introduction to the micro course is also very important, it can help learners to grasp the important basis of learning contents, the micro course should configure the same opening and ending video, unify the style of pictures and language; Again, in the whole procedure of making and using micro course video, teachers need to analyze the needs of learners and characteristics, grasp the prominent tasks of teaching and learning is; Finally, the quality of PPT, sound and video will be the relative factors can affect the learners' interest.

<table>
<thead>
<tr>
<th>Method</th>
<th>Equipment</th>
<th>Teaching contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart phone method</td>
<td>a smart phone, a computer, paper, color pens,</td>
<td>To compare the difference between some knowledge (for example: the necrosis and apoptosis)</td>
</tr>
<tr>
<td>Recording screen software method</td>
<td>a computer, a microphone, powerpoint, Camtasia Studio</td>
<td>Introduce some technology or some history story</td>
</tr>
<tr>
<td>Digital camera method</td>
<td>a digital camera, a tripod, blackboard, chalks,</td>
<td>Explain the mechanism, hypothesis and some procedure of activity</td>
</tr>
</tbody>
</table>

The Feedback and Thinking of Practicing the Micro Course on Medical Cell Biology

Post the Micro Course Video through Different Channels

The format of Micro course video is commonly "rm", "WMV" or "flv", the file size is usually small, so it is suitable for most medical devices. Both the teachers and students can not only watch online videos, scan the teaching plans, check the other learning resources, but also download the resources to the terminal equipment (such as notebook computers, mobile phones or MP4) to save and learn at free time. It is more suitable to evaluate learning, gain the feedback and develop the teaching research for the teachers. With mobile phone or IPAD as the carrier of micro course, it can let students to make use of fragmented time to learn a small interesting topic, discuss with their classmates, teachers and even other strange learners. master the knowledge more efficiently. The application Wechat is a new choice for teachers to post the micro course videos and other resources, Students and teachers can use the software to establish the friendship and solve the puzzle quickly.

Make Full Use of the University's Network Platform to Establish SPOC

With the rapid development of information and technology, we should try to learn the theory and method of teaching reform from the international MOOC and SPOC, try to design high-quality online micro course resources that is suitable for the small class teaching in colleges and universities. If medical colleges and universities can develop more micro course based on diverse topics and post on teaching platform, we will be able to really realize the reverse class.

Summary

With the rapid development of the multimedia technology, Micro courses acted as a new teaching method is widely promoted and applied. Micro courses of medical cell biology based on the MOOC and SPOC improve the learning efficiency and provide a new learning method for students. However, a new type of teaching mode will challenge the teacher's personal ability and cooperation ability in the team. In addition, making the high quality micro courses needs the support of school leadership policy.
and economy. We expect MOOCs and SPOCs both grow significantly in the near future, providing a positive impact on the quality and efficiency of campus education.

Acknowledgement

This work was financially supported by the Postgraduate Innovation Foundation of Shandong Province, China (SDYY12139), Education Innovation Foundation of Weifang medical University (2014Y023) and (2014Y019).

References


