Design and Practice of Flipped Classroom Based on SPOC Blended Teaching Model of Microbiology Monograph

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Abstract: In order to explore the design results of SPOC hybrid teaching mode in microbiology theory flipped classroom, this paper firstly researches and explores the teaching design process and method of microbiology theory flipped classroom based on SPOC hybrid teaching mode, which covers the three stages of pre-course design, in-course design and post-course design, which embodies the concrete embodiment of online and offline teaching, and further analyzes the positive results obtained in teaching practice, including students' active improvement, stronger knowledge mastery and full application of teaching resources, hoping that it can be a reference for improving the quality level of microbiology teaching. We further analyze the positive results obtained in the teaching practice, including the improvement of students' motivation, stronger knowledge mastery and the full application of teaching resources, hoping to provide reference for the improvement of microbiology teaching quality.

Keywords: Blended Spoc; Microbiology Monographs; Flipped Classroom

1. Introduction

Microbiology is an important discipline in the field of biology, which has a wide range of applications in the field of medicine, food science, etc. the microbiology thesis describes the biological characteristics of various types of microorganisms, immune mechanisms, and disease-causing mechanisms, etc., which is a large amount of information and complicated knowledge, and the traditional teaching mode of the teacher's singular explanation restricts the participation of the students, and it is difficult to stimulate the interest of the students, while the SPOC the combination of blended teaching mode and flipped classroom provides a new path for the reform of microbiology teaching.

2. Flipped Classroom Teaching Design of Microbiology Monographs Based on Spoc Blended Teaching Model

The teaching program is designed with the general requirement of “cultivating moral integrity”, adhering to the concept of “focusing on students' development”, and based on the SPOC blended teaching mode, carrying out a highly efficient flipped classroom with students as the main body. the classroom includes results demonstration, knowledge application test, case study, knowledge expansion discussion, topic design, etc., which is interlocked and advances step by step, focusing on shaping students' values and cultivating their higher-order abilities and qualities, such as application, analysis and innovation.

2.1 Pre-Course Design

First of all, it is necessary for the teacher section and the syllabus and teaching objectives of the various theories of microbiology to produce SPOC course resources, which should be recorded in various types of microorganisms to explain the video, which involves the microbial morphology and structure, physicochemical characteristics, pathogenic mechanisms and other knowledge content, and the length of the video is controlled to be around 12 minutes, to fully focus the attention of the students and to be accompanied by the corresponding e-learning materials according to the content produced, to expand the content of the knowledge and the the videos will be 12 minutes in length to fully focus students' attention, and will be accompanied by corresponding electronic courseware, extended knowledge content and reading materials according to the content produced, and uploaded to the SPOC learning platform in a unified way with online test questions [1]. Then in the SPOC platform issued in advance of the classroom teaching corresponding to the learning tasks, for a particular genus of bacteria to explain, require

students to watch the teaching video, and read the electronic courseware, complete the online test questions, to examine the students for the basic mastery of the relevant content; you can also set up some open questions, think about the genus of bacteria pathogenicity and the modern society's way of life how to link, to guide students to think deeply and express their views. It can also set some open questions to consider how the pathogenicity of this genus of bacteria is related to the lifestyle of modern society, guide students to think deeply and express their own views, and the teacher can monitor the students' learning progress and discussion with the help of the platform to provide guidance for them [1].

2.2 In-Class Design

2.2.1 Problem Introduction and Knowledge Review

At the beginning of the class, the teacher uses the questioning channel to do a test on the students' learning before class, and make a review of the previous learning content, for example, you can ask the key morphological features or special metabolic pathways of bacteria for the bacteria genus that was assigned to the learning task before, and combined with the students' answers to understand the mastery of the basic knowledge of the students, and check the omissions and fill in the gaps for them. Then the teacher puts forward several questions that are closely related to the key content of this lesson and are inspiring, such as “what are the typical clinical symptoms and diagnostic difficulties of the diseases caused by this genus of bacteria”, to guide the students into the theme of this lesson [2].

2.2.2 Panel discussion and debriefing

Take the form of five-person groups, for the pre-course layout of the open questions and the teacher to do the classroom introduction to do the discussion, the need for students to exchange their own views and ideas in the group discussion, to explore the answer to the question, the teacher needs to be in the group between the rounds of the process of participating in the discussion of the students, to provide them with the necessary guidance, to help the students to expand their thinking, to prevent the students' discussion from deviating from the original theme [3]. After the students have finished the discussion, each group needs to choose a representative to report the results of the discussion and show the process of discussion, and other groups can ask questions or add to the group's reporting process, so as to promote the collision of ideas and interactive communication among students.

2.2.3 Case study and practical operation.

In order to fully improve students' understanding of microbiology knowledge, the case study approach can be used to help students better grasp the content [3]. For example, you can present the details of a bacterial infection case through multimedia, which covers the patient's symptoms, signs and symptoms after the infection, and the test results provided by the laboratory, etc. Students are required to use their knowledge of microbiology to make a diagnosis and analysis of the patient's condition, and to propose the possible causative microorganisms as well as the specific treatment plan. If the experimental conditions allow, you can also arrange for students to carry out microbiology-related experimental operations on their own, including the isolation and culture of bacteria and identification, which will help students to experience the process of microbiology research and consolidate the knowledge learned in the classroom in the process of practice [3].

2.2.4 Summarize and expand knowledge

Through the group's reporting of the content of the discussion and the case study, the teacher can summarize and summarize the content of the lesson, sort out the microbiological key knowledge content, and emphasize the areas that are easily confused or ignored by the students in their learning. At the same time the teacher combined with cutting-edge science and technology or hot issues to do further extension and expansion, you can introduce the recent discovery of microbial pathogenic mechanism research progress or new antimicrobial drug research and development topics, so that students' horizons have been broadened, but also to stimulate the students for the field of microbiology research interest [4].

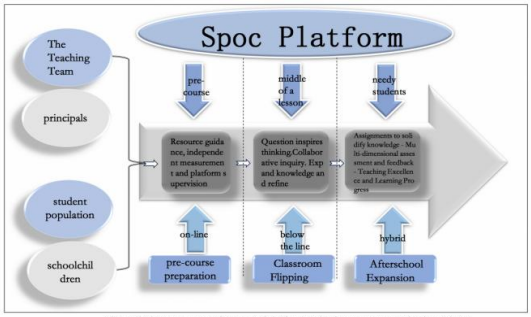
2.3 Post-Course Design

2.3.1 Assignment

Post-class assignments are assigned after the teaching tasks are completed and presented using the SPOC learning system, which can be in different forms such as written assignments or lab reports [5]. One of the written assignments to examine the students for the mastery of classroom knowledge, for example, students are required to draw a variety of microbial life

history schematic diagrams and make a brief description; laboratory report requires students to complete the experiments, and record the entire process of experimental operations and data analysis; can also be arranged in the form of a small paper, requiring students to target the microbiology of a hot topic, you can select In addition, students can be assigned to write a small paper on a hot topic in microbiology, such as "Response Strategies of Microbial Drug Resistance", so as to cultivate students' ability of data collection and literature review, and to promote the formation of students' scientific research thinking.

2.3.2 Learning assessment and feedback



Flipped classroom teaching model of microbiology monographs based on SPOC blended teaching model

Figure 1. Flow Chart of Flipped Classroom Teaching Model based on SPOC Blended Teaching Model of Microbiology Monographs

In teaching, through the establishment of a diversified learning evaluation system, we can obtain the performance of students' learning outcomes, which should mainly include students' online learning performance before class, including the length of students' viewing of learning videos on the SPOC platform, their scores in completing the test questions, and their participation in the discussion forums, etc., and the performance of the students' group discussion reports in class, including the quality of their speeches and their ability to work as a team, as well as the completion of their post-course assignments and their final exam results [6]. In the middle of the class, students' performance in group discussion is evaluated, including the quality of their speeches and teamwork ability, as well as the completion of students' post-course assignments and final exam results, etc. With the help of the SPOC platform, the results of the learning evaluation are regularly fed back to the students, which helps them understand their own learning level and ability deficiencies, and thus adjust their learning programs and strategies, while teachers analyze the problems in teaching according to the students' learning results, summarize the experiences and lessons learned, and serve as a reference for subsequent teaching optimization [7].

3. Effectiveness of Flipped Classroom Teaching Practice of Microbiology Monographs Based on Spoc Blended Teaching Mode

First of all, the enthusiasm of students in teaching is obviously improved. the practice of flipped classroom based on the SPOC blended teaching mode allows students to change from the traditional state of passive knowledge acceptance to the state of active participation, and the independent learning arranged before the class requires students to complete the exploration of learning tasks on their own, which stimulates the interest of students in learning, and the group discussion and reporting sessions set up in the middle of the class further enhances the teamwork ability and task completion ability of the students. the group discussion and reporting sessions set up in the class further enhanced students' teamwork and task completion ability, and the diversified forms at the end of the class cultivated students' innovative thinking and knowledge synthesizing ability, prompting students to have a more positive experience in learning. Secondly, this teaching mode allows students to grasp the knowledge more firmly, before the class students have a preliminary understanding of the content of the teaching, and in the classroom with the help of interactive learning methods to strengthen the discussion between students and consolidation, after the class through homework and counseling to strengthen the students' memory of knowledge, so that the students for the microbiology of the theory of the knowledge of a more solid grasp. In addition, teaching resources are fully utilized in teaching practice. the SPOC learning platform itself covers a large number of teaching resources, and students can complete their learning tasks according to their own learning needs and progress, in which the teaching video can be watched repeatedly to help students understand the important and difficult knowledge, the e-textbook and the extended reading materials broaden students' knowledge and extend their horizons, and the online test questions test students' learning effectiveness. Test questions test the effectiveness of students' learning, as a cornerstone of personalized

learning feedback, teachers can also use the platform to grasp the use of teaching resources, determine the students' learning preferences and needs, to achieve a more effective allocation of resources [8].

4. Conclusion

Flipped classroom teaching of microbiology theories based on SPOC blended teaching mode is an effective reform attempt in modern teaching work, which includes elaborate pre-course design, rich in-class activities and perfect post-course tutoring system, realizes the requirements of online and offline integrated teaching, reaches the mobilization of the students' motivation to participate in the study on their own, and improves the students' ability to apply comprehensive knowledge. the teaching reform of this discipline provides a useful reference for other disciplines and helps to cultivate high-quality talents who are more suitable for the development needs of the current society and era.

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