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Research and Practice of BOPPPS Teaching Model in QQ Group Classroom Platform from the Perspective of SPOC: Taking Python Basic Course as an Example

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Abstract: *The new crown virus epidemic has unexpectedly accelerated the speed of teaching reform, online teaching has become the main teaching mode, SPOC provides a platform for pre-class preparation and after-class tutoring and Q&A, and QQ group classroom provides an online "face-to-face" virtual classroom. The construction of these two platforms ensures the teaching effect and efficiency of the BOPPPS teaching model.*

Keywords: *SPOC platform; QQ group classroom; BOPPPS; Python basics*

During the pandemic, the teaching method is online teaching. How to efficiently complete the content required by the syllabus, especially the theoretical and practical subjects such as Python Foundation, what teaching mode is used, and what kind of online teaching platform is used? This has caused the teachers in our school to think.

1. BOPPPS teaching mode and QQ group classroom learning platform

The BOPPPS model was created in 1976 by the Douglas Kerr team at the University of Vancouver, Canada, and is the theoretical foundation of the ISW, Canada's teacher skills training system[1] .The BOPPPS teaching model divides the process of classroom teaching into six parts: Introduction, Learning Objectives, First Test, Participatory Learning, Post Test, and Summary. In recent years, participatory teaching methods have been favored. Participation is the core content of the BOPPPS teaching model. The BOPPPS teaching method is introduced in the classroom, and the participatory learning is used to stimulate students' learning initiative and enthusiasm, improve their classroom participation, help students understand and apply knowledge more deeply, and improve teaching effectiveness. This teaching method combines the advantages of multiple teaching modes and is suitable for teaching offline flipped classrooms.

SPOC small-scale online courses are the development and supplement of MOOCs [2], and the essence of SPOC is to organically combine high-quality MOOC course resources with classroom teaching, which is a typical hybrid teaching mode that combines online and offline. Students watch videos through the online platform for independent learning and achieve teaching goals. Participate in regular discussion activities to deepen your understanding of the knowledge for the purpose of application. Qq group classroom is equivalent to a virtual classroom. In the classroom, teachers use the "sharing screen" function of qq group classroom to display PPT and corresponding operations, and can use "video call" as needed to communicate with students online", and students review the lesson playback function of the qq group classroom.

2. The auxiliary role of the two teaching platforms

The SPOC platform fully immerses students with teaching videos, provides learning materials for the pre-test link in the BOPPPS teaching mode in the classroom, and lays a knowledge foundation. Because students have pre-class preparation, the relevant classroom links will be carried out more smoothly, and the tension caused by network problems will have a better alleviation effect. Students strengthen their knowledge grasp and understanding by watching micro-lessons through the SPOC platform after class, so as to maximize the utility of answering questions and in-depth inquiries in class[3]. The SPOC platform has an automatic scoring feature. Quickly judging the results of the

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students' pre-test and post-tests saves time in the classroom. Teachers use screen sharing to let students understand the progress of learning, improve their class participation, and also have a spur effect. SPOC provides online tutoring and Q&A for teachers and students. Teachers and students can use the QQ group platform to conduct after-class discussions, answer questions, and timely feedback information. The "QQ Group Classroom" platform realizes online face-to-face teaching, making up for the drawbacks of SPOC teaching and learning async. Using the "QQ Group Classroom" platform, teachers and students attend classes in the same "virtual classroom" according to the time specified in the class schedule. Teachers can use the video function in the "QQ Group Classroom" platform to view the status of students in class, understand the mastery of students' knowledge, adjust the teaching progress, and supervise. Students have constraints, and the class status has improved compared to the SPOC platform, which makes up for the shortcomings of SPOC. On the "QQ Group Classroom" platform, teachers and students communicate online through voice, which improves the efficiency of Q&A. At the same time, it can eliminate the tension of communication among some students. At the same time, qq group classroom also has a course playback function, which is convenient for students to consolidate the knowledge they have learned.

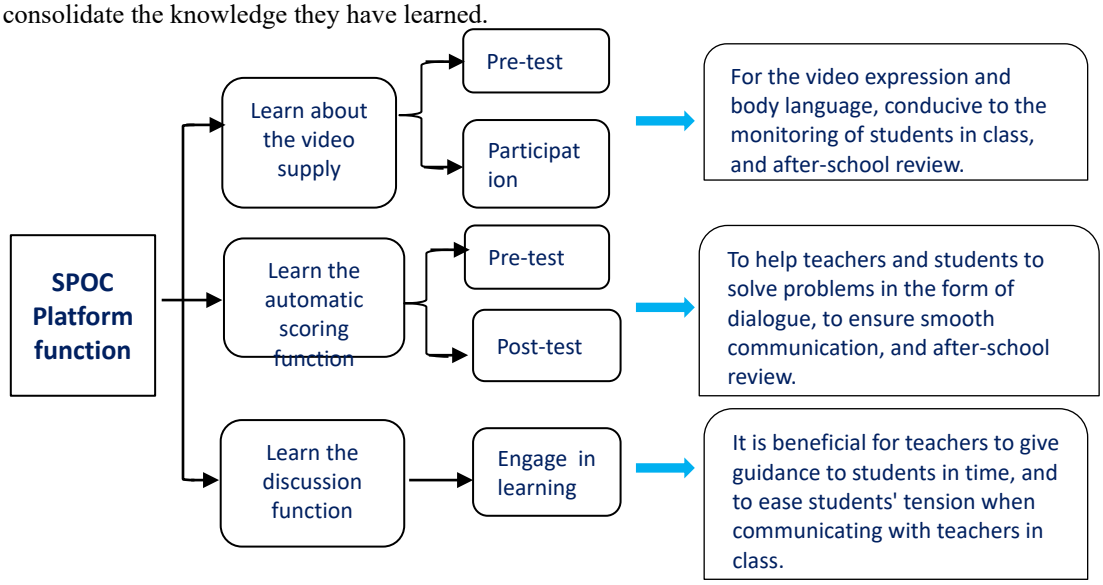

Figure 1: The role of SPOC on the online teaching of "QQ Group Classroom"

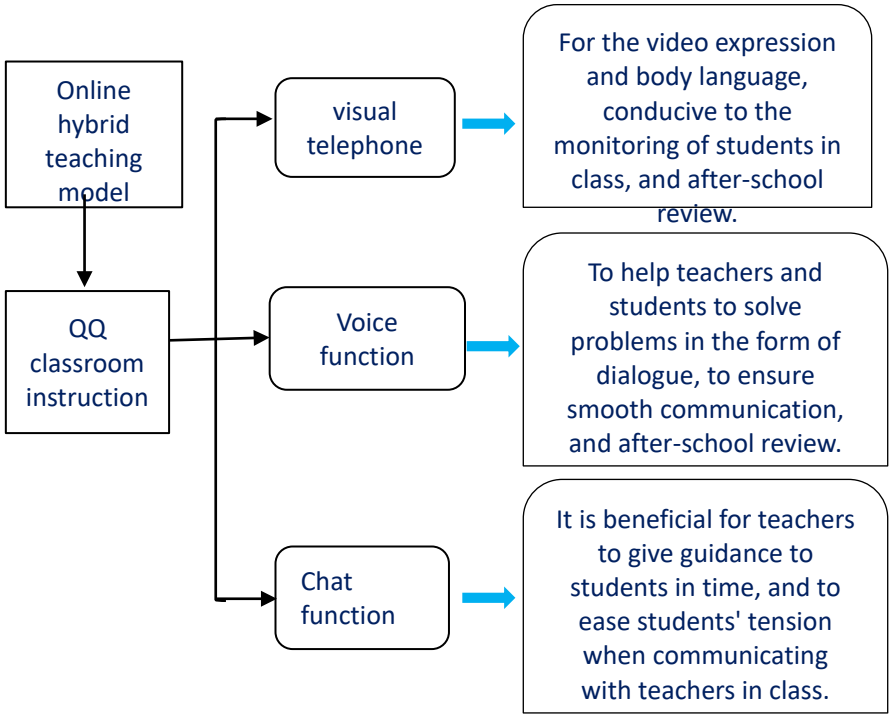

Figure 2: "QQ Group Classroom" online teaching complements the SPOC platform

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3. Apply the BOPPPS online teaching model in the "Python Fundamentals" course

During the epidemic, the use of online teaching has become the main teaching mode at this time. At the same time, a new situation has emerged: students now use online media to take classes at home, and it is difficult to maintain their independent learning status as face-to-face classroom teaching without external pressure and without restraint and relaxation. Because of the use of online teaching, for the Python Programming Integration Course, students are slower to accept. Due to the limited conditions, the same knowledge points need to spend more time on the teachers. And teachers should use a variety of teaching methods, different teaching platforms for teaching, in order to ensure that the teaching task is completed in a limited time. "Python Basics" is a general basic course that plays an important role in the teaching plan. It is usually assessed with a final exam. This course adopts aspects of the traditional teaching mode that need to be improved: First, the teaching method is single, and the teaching results of each lesson are difficult to measure. Students' knowledge base is relatively weak, and their self-learning ability is poor. Most of the learning methods are still stuck in the mode of "teacher-based teaching", coupled with the fact that many theoretical knowledge in Python Programming is more abstract, in most cases, it is necessary to analyze the actual situation, and then program design analysis. In view of this, we mostly adopt a monotonous "PPT+ explanation or practical" teaching mode. This is very restrictive to student engagement in the classroom. There is no quantitative standard for how much knowledge students have in the class. Second, the assessment method is single. Grade evaluation: usual grade (30%) + final grade (70%), it is obvious that the assessment of the student process and the examination of the practical application ability of knowledge are insufficient. Third, the course has a limited number of hours. It is difficult to achieve the teaching objectives specified in the syllabus. Fourth, students lack the ability to use to solve practical life problems.

4. Specific implementation process

Take the use of if statement as an example: Preview (SPOC platform): First link the POPC platform to the students in the QQ group, and publish the relevant knowledge points and assignments as the pre-test assessment object. Students watch videos for self-study, prepare for pre-class tests, improve pre-class knowledge, and save teaching time. Teachers can view students' progress in the background as part of their usual grades. Import (QQ group classroom): Share PPT through the QQ group classroom screen sharing function, tell what type of judgment the if statement generally solves, use the format, indentation and other knowledge points. Target (QQ group classroom): use a colon after each if statement condition; Use indentation to divide statement blocks, etc. Front Test (SPOC Platform): Test students' knowledge level before class (knowledge review), with a simple fill-in-the-blank title. Engagement (SPOC Platform): Called "I'm going to do it." Example: Train ticket purchase program. Groups of four to six people use group discussions and intra-group mutual evaluation to learn knowledge. Post-Test (SPOC Platform): Student Grade Determination Procedure. Test students' knowledge. Summary (QQ Group Classroom): Give students a chance to reflect, what content have they learned? The teacher summarizes the student's learning status. Tutoring Q&A (SPOC platform or QQ group): Students who still have questions about the content of this lesson can communicate with teachers and classmates on the SPOC or QQ group to better deepen their understanding of knowledge.

5. BOPPPS Online Teaching Model Scoring Criteria

The final grade of the course consists of two parts: process assessment (50%) and final assessment (50%).Among them, the process assessment includes: attendance per course (6%); SPOC platform learning progress and pre-test score (9%); Post-classroom test score (13%); Consists of class engagement (12%) and student progress (10%).

6. The curriculum itself has areas for improvement

The Python Program Foundation Course, as a common foundation course for all undergraduate majors, has an important place in the teaching plan. It is usually assessed in the form of a final exam. The teaching model is based on traditional teaching, and there are many aspects that need to be improved. First, the teaching method is single, and the teaching results of each lesson are difficult to measure. Since the basic courses of the Python program are mostly offered for the first half of the first semester, the students' knowledge base is relatively weak and their self-learning ability is poor.. Most

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of the learning methods are still in the mode of "teacher-based teaching", and many of the knowledge in the Python program basic course is more abstract, and in most cases, it is necessary to analyze the program. Due to this situation, most of the teachers adopt the teaching mode of "PPT + explanation" single teaching. The "cramming" model limits student engagement in the classroom. There is no quantitative standard for teachers to grasp how much knowledge is taught in the class and whether there is any improvement. Second, the assessment method is single. The grading standard of the course is based on the final final grade, usually accounting for about 70%, which can be described as "one test for life", ignoring the assessment of the student process and the examination of the ability to use knowledge. Third, the course has a limited number of hours. Most teachers reported that it was difficult to meet the teaching objectives set out in the syllabus according to the currently prescribed school hours. Fourth, students lack the ability to use Python program knowledge to solve practical life problems, ignoring the cultivation of students' knowledge application ability.

7. Conclusion

The "SPOC+ QQ Group Classroom" platform solves the dilemma that teachers and students cannot return to school for normal teaching activities due to the epidemic, and ensures the teaching efficiency and teaching effect. It alleviates the discomfort caused by online classes by teachers and students, and becomes a favorable auxiliary for online classes of Python program basic courses. The use of the BOPPPS teaching model in the teaching process of Python program basic courses has changed the traditional teaching methods of programming basic courses, embodied the "student-centered" teaching concept, and not only improved the enthusiasm of students on the "other end of the computer" but also improved students' self-learning ability and practical application ability, and realized teaching benefits. In the process of online teaching, the practical application ability of computers has been improved, which has also caused teachers to think about the traditional teaching mode, which is a good opportunity for the reform of traditional teaching.

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