Research on Blended Teaching Based on "MOOC + SPOC + multimodal classroom"

Hua Zhang, Miao Zhang, Chunshan Li*, Dianhui Chu, Zhiying Tu

Abstract: Combined with China's educational reality and the vigorous development of MOOC and SPOC, this paper discusses the connotation and mode of blended teaching based on "MOOC + SPOC + multimodal classroom", and puts forward that blended teaching is the deep integration of "teaching" as the center and "learning" as the center. The classroom form of blended teaching is various and rich, which is defined as multimodal classroom, and the common forms of multimodal classroom are given. This paper summarizes the specific problems encountered in the implementation of blended teaching, and gives the solutions. Based on Bloom's cognitive model and Dewey's "learning by doing" theory, the scheme takes cumulative assessment as the starting point, makes full use of intelligent teaching tools such as rain classroom and mobile cloud classroom, and pays more attention to the agility of teaching and the coordination inside and outside the classroom. Through practice, the teaching efficiency and effect are improved obviously.

Key words: blended teaching; multimodal classroom; MOOC; SPOC

1　Introduction

Nowadays, with the rapid development of Internet education, blended teaching has received unprecedented attention. Teachers are exploring how to use first-class online resources, reengineer classroom teaching programs, and carry out blended teaching based on "MOOC" and "SPOC", so as to improve the quality of teaching.

As for blended teaching, paper[1] first put forward five "appropriateness" in 2001, that is, blended learning emphasizes matching "appropriateness" individual learning style by using "appropriateness" learning technology, transferring "appropriateness" skills to "appropriateness" people at "appropriateness" time, so as to achieve the optimal learning goal. In China, paper[2] first put forward that blended teaching is mainly to combine the advantages of traditional teaching and e-learning to obtain the best learning effect, and will have a significant impact on the theory of educational technology, the application of information technology in education and the theory of instructional design. Paper[3] made a systematic analysis of the theoretical and environmental basis and implementation mode of blended teaching, and believed that with the deepening of educational informatization, blended teaching will be widely concerned. The blended teaching mode based on SPOC can give better play to the value of MOOC, so as to improve the teaching quality of higher education and promote teaching fairness[4]. Practice shows that MOOC and

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traditional classroom teaching are integrated to achieve the combination of online and offline, complementing each other inside and outside the classroom, which has a good teaching response[5]. The theoretical basis and teaching design mode of blended teaching[6] and the practical mode of blended teaching based on flipped classroom[7-8] are becoming more and more perfect. The research and practice of blended teaching based on rain classroom[9-10], cloud classroom[11], mobile cloud classroom[12] and other intelligent teaching tools are increasingly popular. Using artificial intelligence technology to analyze blended teaching data to carry out personalized, accurate and intelligent teaching is beginning to appear[13]. People pay more attention to the key elements of blended instructional design[14], the differentiation of online learning and face-to-face learning, and the corresponding solutions [15].

It can be seen that after years of exploration and practice, with the promotion of MOOC and various modern educational technologies, blended teaching has made great progress.

2　Problems in the Implementation of Blended Teaching

In the process of implementing the blended teaching of many courses, the following specific problems are found.

1) Lack of self-directed learning ability outside class.

It is too ideal to complete the online teaching content in MOOC / SPOC relying only on students' consciousness. Most students' online learning effect has not been improved to the best state, and the teaching effect of offline classroom is also affected.

2) Insufficient participation in class discussion.

The enthusiasm of students to participate in classroom presentation and discussion is still dominated by the teacher's traction, which greatly affects the effect, coverage of classroom presentation and discussion, and cooperation level between students.

3) Heavy learning task and strong fatigue.

Online and offline learning takes up a long time and can't balance other courses. With the popularity of blended teaching, if we don't make adjustments, this problem will become more and more prominent in the later stage.

4) Not agile and smooth enough for the collaborative promotion mechanism of pre class - in class - after class.

The multi-dimensional learning information, such as learning situation outside class, test situation, attendance situation, discussion data collection, problem recording and collection, homework data collection and feedback, comprehensive statistics and analysis, has not fully played an effective role. It is difficult to do a good job in the organic coordination of pre class, in class and after class only relying on an online teaching platform or intelligent teaching tools. The interrelation of multi teaching platforms or intelligent teaching tools needs to be strengthened.

3　Blended Teaching Mode Based on "MOOC + SPOC + multimodal classroom"

In view of the above problems, this paper designs a blended teaching mode based on "MOOC + SPOC + multimodal classroom", as shown in Fig. 1. MOOC highlights the large-scale opening of online teaching, SPOC focuses on customization, and MOOC and SPOC are suitable for learning outside the classroom. Multimodal classroom emphasizes the diversity and individuality of classroom teaching. The blended teaching of the three is a deep integration of traditional teaching and personalized teaching, which is based on the basic national conditions of large number of students, large class capacity, difficulty in teaching students in accordance with their aptitude, unbalanced development of eastern and western education, and vigorous development of the Internet. Teachers as the leading role and students as the main body are the foundation of blended teaching, and the goal is to improve teaching efficiency and effect.

First, blended teaching is a deep integration of teaching centered and learning centered based on
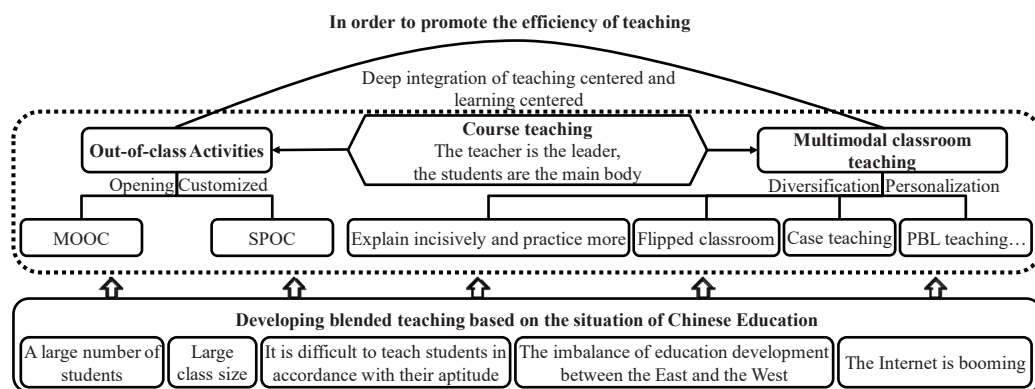
In order to promote the efficiency of teaching

Deep integration of teaching centered and learning centered

Out-of-class Activities | **Course teaching** The teacher is the leader, the students are the main body | **Multimodal classroom teaching**

Opening Customized | Diversification Personalization

MOOC | SPOC | Explain incisively and practice more | Flipped classroom | Case teaching | PBL teaching…

Developing blended teaching based on the situation of Chinese Education

A large number of students | Large class size | It is difficult to teach students in accordance with their aptitude | The imbalance of education development between the East and the West | The Internet is booming

Fig. 1   Blended teaching mode based on "MOOC + SPOC + multimodal classroom".

national conditions. Since the reform and opening up, China's education, especially higher education, has made great progress. However, due to the large population base, there are still many practical problems, such as large number of students, large class capacity, large gap between the eastern and western education levels, students' passive learning, difficulties in teaching students in accordance with their aptitude and so on. However, with the rapid development of Internet education in recent years, the emergence of online education platforms such as MOOC, good university online and MOOC in Chinese has provided an opportunity to carry out personalized teaching in traditional classrooms and solve the problem of large educational gap between the east and the west through online sharing and live classes. Under this background, blended teaching has been paid more and more attention by the state and educational circles. It can be said that the application of blended teaching in China is based on the deep integration of traditional teaching centered on teaching and personalized

teaching centered on learning in the Internet education environment.

Second, with the support of various online resources, teachers can carry out rich and colorful classroom teaching, namely multimodal classroom. Traditional classroom, flipped classroom, live class, PBL and case teaching all belong to the category of multimodal classroom. This kind of blended teaching mode based on MOOC, SPOC and multimodal classroom is the expansion and integration of various forms of classroom teaching, emphasizing the diversity of teacher led classroom, highlighting the dominant position of students and the individualization of learning, and paying more attention to the efficiency and effect of teaching.

4   The Logical Relationship of MOOC, SPOC and Multimodal Classroom

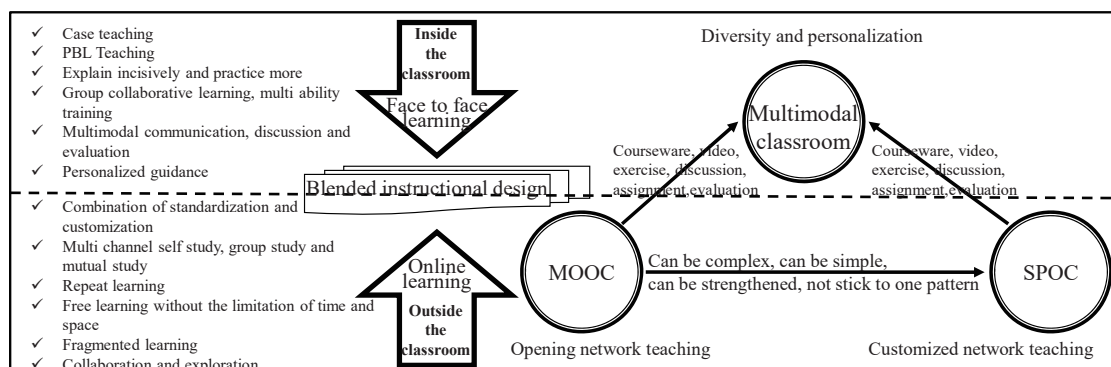The logical relationship of the MOOC, SPOC and multimodal classroom is shown in Fig. 2.

✓ Case teaching
✓ PBL Teaching
✓ Explain incisively and practice more
✓ Group collaborative learning, multi ability training
✓ Multimodal communication, discussion and evaluation
✓ Personalized guidance

✓ Combination of standardization and customization
✓ Multi channel self study, group study and mutual study
✓ Repeat learning
✓ Free learning without the limitation of time and space
✓ Fragmented learning
✓ Collaboration and exploration

Inside the classroom
Face to face learning

Blended instructional design

Online learning
Outside the classroom

Diversity and personalization

Multimodal classroom

Courseware, video, exercise, discussion, assignment, evaluation | Courseware, video, exercise, discussion, assignment, evaluation

MOOC — Can be complex, can be simple, can be strengthened, not stick to one pattern → SPOC

Opening network teaching | Customized network teaching

Fig. 2   The logical relationship among MOOC, SPOC and multimodal classroom.

First of all, MOOC solves the large-scale network teaching of a course's specified content or benchmarking content. Through MOOC, students can enjoy excellent resources, self-directed learning cross-school and cross-specialty, make full use of fragmented time to learn, learning place is not limited to the classroom, and difficult learning can be repeated.

Secondly, SPOC is the specific customization of MOOC in the school education environment. SPOC solves the differentiated network teaching of different people in different schools, and its content can be higher or lower than the MOOC curriculum content. Students can enjoy the private customized teaching content.

Finally, multimodal classroom is the extension of traditional classroom in MOOC and SPOC environment. With MOOC and SPOC, the teaching space of offline classroom can be released as much as possible. Teachers can take time to fully interact with students and explain more wonderful contents in the way of flipped classroom and live class, so as to promote the internalization of knowledge and improve students' problem-solving ability and innovative thinking level.

5   Blended Teaching Execution Mechanism Based on "MOOC + SPOC + multimodal classroom"

Reflecting on the problems encountered in the blended teaching, it is not difficult to see that although MOOC and SPOC provide a larger space for classroom teaching, in the actual operation process, the integration of online and offline blended teaching mode in content, class hours, organization mode and means needs further optimization and design. Therefore, the key to do a good job of blended teaching is how to optimize the process of blended teaching and improve the teaching efficiency and effect. Therefore, a blended teaching execution mechanism based on "MOOC + SPOC + multimodal classroom" is constructed, as shown in Fig. 3.
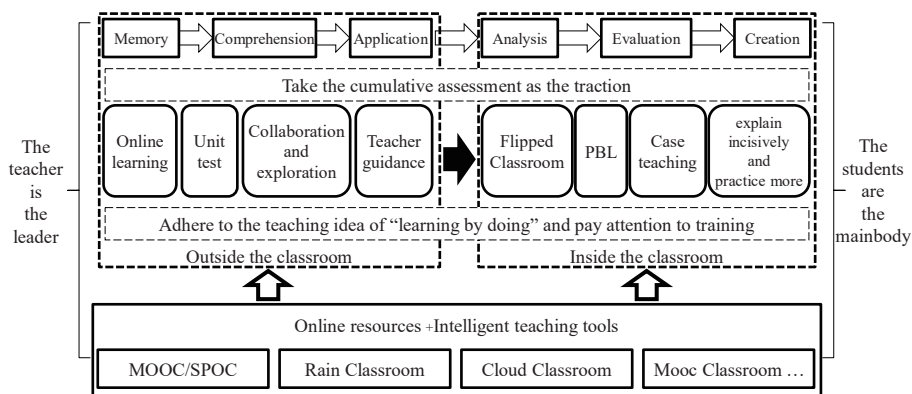

Fig. 3   Blended teaching execution mechanism based on "MOOC + SPOC + multimodal classroom".

First of all, adhere to the concept of "learning by doing" to carry out blended teaching. The idea originated from Dewey, an American educator, who believes that the improvement of students' thinking or ability is achieved through continuous exploration. Therefore, no matter inside the classroom or outside the classroom, students must complete certain tasks. It is said that you have to learn if you have a learning task. Tasks generally refer to all the things left for students to do independently, including general assignments, exercises, tests, experiments, big assignments, curriculum design, discussions, etc. The more important work of teachers is to guide students to explore and complete certain tasks while teaching well.

Then, with the cumulative assessment cognition as a handle, the goal of each level can be achieved through the interrelation and organic coordination inside and outside the classroom. Teachers need to arrange the content of online learning before class according to the teaching progress. In order to ensure the effect of

knowledge internalization, they need to be equipped with the corresponding unit test. For big assignments, curriculum design and other large tasks need group cooperation and teacher guidance, which also need to be completed outside class. The teaching goal of this stage is to memorize, understand and apply knowledge. At the same time, based on extracurricular learning, let students come to class with tasks and problems. Teaching methods in class are diverse and flexible, including flipped classroom, PBL teaching, case teaching and practice instead of lecture. The goal is to cultivate students' ability of analysis, evaluation and creativity.

Finally, intelligent teaching tools are introduced to make blended teaching more agile. The mainstream intelligent teaching tools in China include rain class, mobile cloud class, MOOC classroom, etc.

By using these tools, teachers and students can keep connected at any time through mobile phones. Whether in class or outside class, they can obtain real-time learning data, quantitatively understand the actual situation of teaching, ensure real-time controllable teaching state, and make teaching agile and efficient.

6   Conclusion

In the spring semester of 2020, the blended teaching based on "MOOC + SPOC + multimodal classroom" was carried out for set theory and graph theory, data structure and other courses. A multi-channel collaborative teaching management and control mechanism for "pre class - in class - after class" integrating MOOC, SPOC, MOOC classroom, live class and QQ group multi-channel collaborative pre class, in class and after class was established, as shown in Fig. 4.
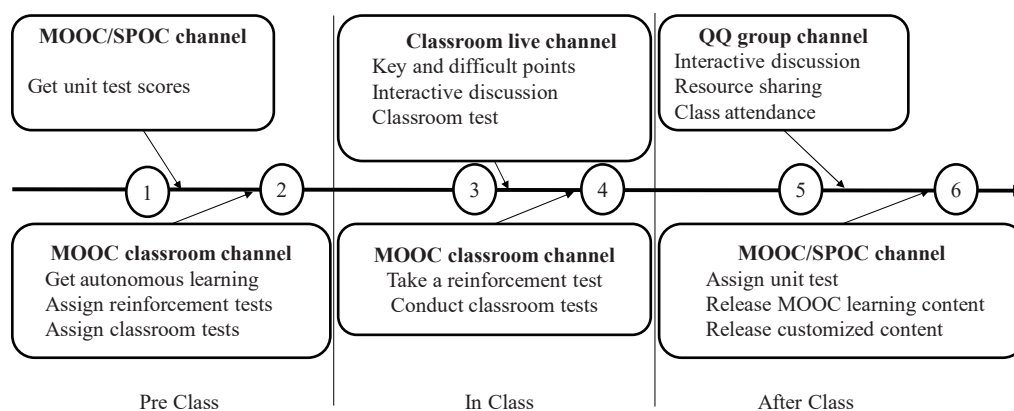

Fig. 4   Pre class, in class and after class fusion under the traction of learning channel and learning data.

Under the guidance of each learning channel and learning data, inside and outside the classroom are closely linked with each other, realizing the three-dimensional control of teaching, and the pass rate and excellent rate are significantly improved. Students at all levels can lay a good foundation for the course, and at the same time, make a breakthrough in the achievement of high-level teaching objectives. Therefore, it achieves the organic integration of teacher led and student-centered, self-directed learning and collaborative learning, online teaching and offline teaching, basic goal and advanced goal, traditional teaching and personalized and agile teaching.

The next step is to collect and sort out the current advanced educational theories and means of blended teaching, and curriculum integration cases, pay attention to the reconstruction of curriculum teaching process and the improvement of curriculum connotation, and explore the evaluation method of students' learning effect driven by blended teaching.

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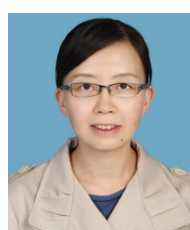
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