

# Reform and Research of SPOC Blended Teaching Models Against the Backdrop of Internet +

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**Abstract**—For the defects in the domestic MOOC teaching at the current stage, the reform scheme on the SPOC online and offline blended teaching models will be explored based on the development and changes in the learning situation of the application-oriented universities in the teaching reform course. The comprehensive application of the organic combinations among the network learning platform, Micro-lectures online video, online evaluation system and classroom teaching, and practical teaching in the process of reform implementation not only can overcome the disadvantages of the traditional teaching methods which are simple and unilateral, but also make up that of large open MOOC difficult to be managed and harmful to the interactions.

**Keywords**—MOOC; SPOC; CAI; NTP

## I. INTRODUCTION

In 2018, the Ministry of Education formally launched 490 "National-level Massive Open Online Courses" which are the first batch of National-level Massive Open Online Courses (MOOC) launched nationally and internationally [1]. Currently, China has launched 5,000 MOOCs.

The question arises, the highly developed MOOC gradually exposes its disadvantages [2]: Firstly, there is no threshold for joining courses, a wide range of target audience and huge quantity of students participating in the course learning, which are not conducive to the course management. Secondly, the courses cannot consider the needs of students at all levels due to the great differences in the learning foundation among the students. Thirdly, MOOC is the open course based on the Internet, the learning course of students is lack of effective supervision, and some students fail to achieve good results due to insufficient sense of urgency and unclear learning target. According to the statistics, the average course completion rate of students who take part in MOOC isn't up to 5% [3]. Fourthly, MOOC belongs to the pure web-based instruction model, the teachers can't know the learning condition of students in real

time, which isn't conducive to the interactive learning. Fifthly, the learning results of domestic MOOCs at the present stage are difficult to obtain the authorized certification and can't be granted credits. Additionally, the problems, for example the teachers can't know the learning process of students and there is no scientific and efficient evaluation mechanism are also existed in MOOCs. In view of all above disadvantages, the people are compelled to reexamine its functions.

Prof. Robert Lue, Director of the online course platform HarvardX project [4] of Harvard University believes that: "MOOC only represents the initial form of online education, but the current situation has been changed that we have been in the 'post stage of MOOC'" [5]. Therefore, the course isn't necessarily massive or opens [6]. In such case, a new type of SPOC (Small Private Online Course) appeared [7], of which the "Small and Private" are relative to "Massive and Open" in MOOC, "Small" indicates the small application range of courses, "Private" indicates that only the students who have satisfied certain access conditions can take part in the course learning, and such qualified students must take part in all learning stages, complete the specified learning tasks and take the examinations. SPOC can be specially designed for the small range of students based on each teaching link, which not only can take the advantages of MOOC, but also effectively make up the disadvantages of MOOC and defects of traditional teaching, which is inheritance and development of MOOC.

## II. DESIGN OF BLENDED TEACHING MODELS BASED ON SPOC

SPOC is generally designed for the students in a certain field, which is a blended learning model of classroom and online teaching. SPOC carries out the blended online and offline learning by three stages of "Before class - In class - After class" [8] with the diversified teaching resources and based on the network teaching platform, and the main teaching links of SPOC blended teaching models are shown in Figure 1.

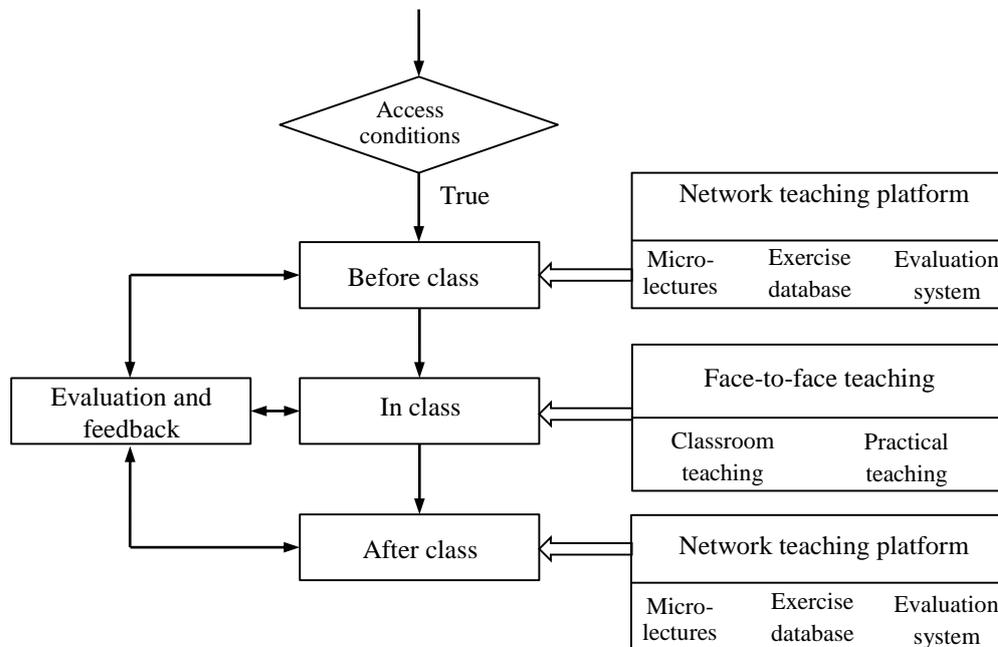


Fig. 1 Main Teaching Links of SPOC Blended Teaching Models

The video teaching is applied before class, the students can watch the "Micro-lectures" video to preview the knowledge, learn and think independently, grasp the key and difficult teaching points, and take part in the next teaching link "In class" with the questions.

In class, the teachers can put the time and efforts into higher-value activities such as the discussion, task collaboration and face-to-face exchange and interaction, such means not only saves the classroom time, but also effectively improves the teaching breadth and depth in the classroom, enhances the level of interaction between teachers and students, and promotes the classroom efficiency.

After class, the flipped classroom teaching is implemented with the following basic process: After completing the classroom teaching tasks, the teacher will assign the "Micro-lectures" and online examination as the homework to students, and then know the learning situation of students, answer the questions of students, review and explain the homework, and arrange other tasks in the practical classroom.

SPOC blended teaching models are based on the online teaching platform, consisting of the online and offline courses, which are mainly used by the college students. Its teaching design is divided into the following aspects with the comprehensive consideration of teaching objectives, conditions and resources:

(1) Teaching contents: Include Micro-lectures, exercise database, teaching courseware, etc. are integrated by means of the online teaching platform and based on the requirements of teaching outlines and the professional training objectives in order to create a teaching content system by the knowledge points.

(2) Teaching process: the blended model of online network learning and offline classroom learning is applied, and the entire learning process includes: Watch Micro-lectures video before class to preview the relevant knowledge points and concepts; Learn and discuss the knowledge points in the classroom; Watch Micro-lectures vide, complete the homework and experiments to consolidate the knowledge points after class.

(3) Evaluation system: the scientific evaluation system not only can objectively reflect the students' learning effect, but also improve their initiative and enthusiasm, and the comprehensive evaluation system integrating the teacher evaluation with the online learning time, number of watching videos, completion rate of homework and examination results will be explored.

### III. IMPLEMENTATION OF BLENDED TEACHING MODELS BASED ON SPOC

The reform of blended teaching models based on SPOC promoted the development of small, restrictive and interactive open teaching model, which can't be separated from the support from computer and network. The computer assisted instruction (CAI) is the important development trend of course reform under the background of "Internet and Education". The rapid growth of network bandwidth and the popularization of mobile communication equipment further shortened the educational gap, and the network learning and mobile learning can solve the "time-space" restricted problem in the traditional teaching, facilitate the implementation of 4A learning mode (i.e. Anyone, Anytime, Anywhere and Any style [9]) which can allow students arranging their learning activities by themselves without the restriction of time and space, and reasonably utilize the fragmented time to effectively learn and improve the online learning participation of students.

The blended teaching model based on SPOC utilizes the network teaching platform (NTP) as its primary technical means, and NTP can realize the information resource sharing and interactive learning within a larger scope. The teacher enriches, makes the classroom climate active, and promotes the teaching effect by various web-based teaching methods. On the other hand, the interactive learning allows the teacher knowing well the learning situation, and the diversification and feedback of NTP make the students indirectly become the designer of teaching contents and the participator of teaching reform, many new teaching ideas and methods are just sourced from the changes in the learning situation and in the talent demand of the society.

The traditional offline classroom teaching model already can't adapt the growing information needs of teaching

resources. We carry out the exploration and research of blended teaching models based on SPOC by means of the school network resources and online teaching platform. The online teaching platform is the teaching and examination auxiliary system based on B/S (browser / server). It is the comprehensive platform of homework, questions and answers, examinations, students' practice, etc. It is convenient to use with powerful functions and can help teachers complete all teaching tasks (excluding the classroom teaching) and also provide the students with the simple, quick and efficient learning method and exchange platform. Compared to the traditional teaching model, the functions of blended teaching model based on SPOC have the considerable advantages. The comparative analysis between the traditional model and blended model is shown in Table 1.

TABLE I COMPARATIVE ANALYSIS BETWEEN TRADITIONAL MODEL AND BLENDED MODEL

Contents	Traditional model	Blended model
Teaching	Multimedia courseware and blackboard-writing	Micro-lectures and classroom teaching
Homework	Manually set the questions	Select the questions from the exercise database
	Teacher assigns the homework	NTP issues the homework
	Manually collect the students' homework	NTP automatically collects the students' homework
	Teacher manually inspects the students' homework	Machine and teacher inspect the students' homework
Experiments	Paper report	Electronic report
Exchange	Face-to-face	Face-to-face and online
Examination	Manually set the examination questions	Select the examination questions from the exercise database
	Manual typesetting	No typesetting
	The physical examination paper can't be modified	The electronic examination paper can be modified at any time
	A lot of sheets used	No printing
	A lot of space occupied	Mobile storage or network storage
	The examination papers are kept by teachers	The examination papers are stored by the server
	The examination papers are distributed by the supervisor	NTP automatically completes the distribution
	Classroom	Computer room
	Fixed questions	Random questions
	Time by the supervisor	Automatically time by NTP
	Supervisor collects the examination papers	NTP automatically collects the examination papers
Marking	Teacher	Machine and teacher
Grade evaluation	Manual statistics by the teacher	Automatic statistics by NTP
Storage	Physical examination paper	Light disk, hard disk, etc.

Description: The conventional teaching processes listed in Table 1 include: Teaching, homework, experiments, answer, examination, etc., of which the examination link further includes the examination paper preparation, printing, examination, inspection, grade evaluation, make-up, paper filing, etc.

IV. OBJECTIVES OF REFORM

In order to realize the objective of training the application-oriented talents and solve the contradiction of poor operational ability and lack autonomous learning ability of students in the ordinary colleges and universities, the SPOC blended teaching model will be reformed and innovated on the basis of "focus on foundation, application, practice and Autonomy". The organic combination of the online knowledge points Micro-lectures, exercise database and evaluation system with the face-to-face classroom teaching and practical teaching can more reasonably organize the "online and offline" teaching

resources. The entire teaching process is based on the theory, guided by the Micro-lectures, promoted by the self-examination, and oriented to the application, all of which greatly highlight the students' dominant position, emphasize and train the independent learning ability of students, and the objectives of reform mainly involve the following three aspects:

(1) To realize the transformation of course functions. The principal objective of course reform is to optimize the course functions, change the tendency the teachers often pay more attention to the knowledge transference in the traditional teaching process, highlight the students' dominant position, allow them to have many independent learning opportunities, and arouse their inherent learning motivation. It also aims at training the students to master the learning, cooperation, creative spirit, and practical ability, forming the aspiration and power of lifelong learning and promoting to establish the sound values.

(2) To realize the transformation of the teachers' teaching methods and the students' learning methods. The teacher shall actively interact and mutually develop with the students, and timely find the problems and adjust the teaching contents in the teaching process. The teacher also shall properly handle the relation between the knowledge transference and training ability, pay more attention to training the students' independence and autonomy, guide the students to question, explore, practice and cooperate, and promote their active and personalized learning under the teachers' guidance. The teacher shall respect the students' personality, pay attention to the individual difference, satisfy the learning demands of different students, create the teaching environment for guiding their active participation, stimulate their learning enthusiasm, and fully develop each student [10].

The teacher also shall vigorously promote the popularization of network learning and mobile learning in the teaching process, enhance the relations between the course contents and modern social and scientific developments, guide the students to actively explore the concepts and application of knowledge points by means of network resources, reflect the physical and mental development of modern college students, gradually realize the reform of presentation methods of teaching contents, the learning methods of students, teaching methods of teachers, and interactive methods between the students and teachers, and fully develop the advantages of Internet + Education [10].

3) To establish the diversified examination and evaluation mechanism based on the concept of quality-oriented education. For this purpose, we shall build an evaluation system that can promote the all-round development of students, enhance the investigation on student ability and quality, and pay the close attention to the learning process evaluation, which includes four aspects of online independent learning, offline classroom teaching, practical training and comprehensive evaluation, and the total score consists of the completion rate of independent learning, classroom performance, completion rate of practical work, and comprehensive examination results.

## V. CONCLUSIONS

SPOC blended teaching model redirects the innovation and reform of education models in the colleges and universities. Under such teaching model, the students are encouraged to independently learn, and make full use of computer, network and mobile communication devices to learn whenever and wherever possible with the fragmented time. The teachers in the course team are responsible for its supervision and management, comprehensively evaluating the learning outcomes of students, establishing the corresponding quality feedback mechanism and reward and punishment system to constantly promote the learning outcomes. The teachers can set and adjust the teaching content, depth and breadth of courses based on the subject training objective, the social demand for talents, the changes in the learning situation in order to reasonably allocate the teaching resources, shorten the learning time, improve the teaching quality, and realizes the optimal teaching effect.

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