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Application of Flipped Classroom on Auxiliary Machinery

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***Abstract*—Application of flipped classroom on auxiliary machinery achieved a high degree of integration of online learning and traditional classroom learning. The combination of flipped classroom and auxiliary machinery, not only breaks through the limitations of blended learning to achieve a higher degree of mixing levels, but also improves the students' autonomy in learning, which conquers the scarcity of the traditional teaching model in higher education. Flipped classroom promotes the effective teaching method, and it can provide new ideas for academic advising of students. So it can help a lot in the development of students.**

Keywords—flipped classroom; auxiliary machinery; higher education; teaching model

I. INTRODUCTION

In the age of information, the technology tools are widely adopted in classes and the learning styles of students are becoming networking. At the same time, the teaching methods combine with the network and information. Given this, flipped classroom appears. The flipped classroom is a new teaching model[1]. In current years, it attracts the attention of teachers and researchers. Flipped classroom means that students learn independently with the learning materials provided by the teachers before classes, and then solve questions through discussion with teachers or classmates in class, in which students play the role of active learners rather than passive listeners in traditional classes. This learning model will give students more freedom to learn. At the same time, it can motivate the students' enthusiasm. It provides effective solutions for the problem of ignoring students' differences in traditional classroom[2]. Instead of traditional teaching, pre-class preparation and discussion in groups become important means for knowledge transfer, so as to provide an opportunity for learners to learn actively.

Although flipped classroom begin in primary and secondary schools, it also receives positive feedback from many universities. How to cultivate students' ability of self-exploration and practical application so as to better adapt to the needs of social practice has always been a concern of universities. This paper combines the auxiliary mechanical with the flipped classroom; at the same time, the implementation model of a flipped classroom is put forward.

II. PRINCIPLE OF IMPLEMENTATION FOR FLIPPED CLASSROOM

In general, the process of teaching can be divided into two phases: transfer of information and internalization of knowledge[3]. In the traditional teaching, they are accomplished by teachers' teaching and students' homework or practice. In the flipped classroom, teachers give students more freedom to learn. With the help of multimedia technologies such as the Internet, students use recorded teaching videos to complete the first stage before classes. In this process, students are free to choose the most suitable way to finish them. And the time in the class is for the second stage. In this way, the teacher and students will have more opportunities to communication.

Most people comprehend that the flipped classroom equals "teaching before classes + internalizing in class"[4]. That is just contrary to traditional teaching model. Actually, the activities of the students watching multimedia videos and doing practice before classes are not a simple preview of knowledge, but an in-depth understanding, which is the foundation of taking the problem to a deeper level. At the same time, it should also be recognized that the flipped classroom and online videos are not the same. The most important value of flipped classroom is the face-to-face interactive learning activities, which should lead to a deeper level of understanding through the discussion and sharing. The flipped classroom is absolutely different from the traditional teaching process, and it brings fundamental changes in elements of classroom teaching, shown in the table1.

TABLE I. CHANGES BETWEEN FLIPPED CLASSROOM AND TRADITIONAL CLASSROOM

	Flipped classroom	**Traditional classroom**
Teachers	Guider or Mentor	Instructor and Organizer
Students	Proactive inquirer	Passivity inquirer
Teaching mode	Understanding + internalizing in class	Teaching and homework
Technical approach	Freedom to learn before class, Interactive learning, discussion in class,	Teach in class
Evaluation mode	Examined by teacher or classmates	Paper testing

III. IMPLEMENTATION OF FLIPPED CLASSROOM

Flipped classroom, shown as the name, includes the pre-class learning activities and the internalizing activities in classroom learning[5]. The implementation model is shown in Fig.1.

A. Pre-class preparation stage

Activity objective: Complete the remembering and understanding of knowledge.

Teacher: (1)The teacher uploads the teaching videos to the online courses platform before classes. The time of Video for each lesson is limited in 30 minutes. (2) Sort out the problems reflected by students before classes.

Students: (1)The students land onto the study platform, study the teaching videos before classes. If students have difficulties or doubts, they can feedback the questions to the platform. The teacher will sort out the questions raised by the students before classes. (2)Understand and remember the learning contents of this class.

B. Internalizing stage in class

Activity objective: A higher level of awareness of the contents.

Teacher: (1)Focus on the problems raised by students before class; (2)Most of the time in the class, the students are given exercises. In this process, the teacher acts as a guider or a mentor.

Students: (1)Through the teacher's explanation, there is a deeper understanding about the contents of this class; (2)Study in groups with classmates to complete exercises. (3)When facing a problem, the groups discuss it.

At the beginning of the flipped classroom, the teacher focuses on the questions raised by students on the platform and answers them. This is helpful for solving the difficulties that students have in the pre-class learning process. Then, by a pre-class test, the teacher instructs the key points of this lesson, which need to be mastered. After the problem is explained, the teacher divides the classes into groups, the students study in groups. Then a group reporting is required, in which the reporters introduces their ideas to their classmates. Students learn in groups of 6-10 people, discuss and solve problems together, at the same time, they help each other to learn. In this way, the knowledge learned before class is consolidated through group discussions in class.

Notes: Since the students have already studied as required before class, the task in class is to internalize what students learn before. Therefore, teachers should not add new knowledge content in class. When students work together, teachers should observe the learning status of each group and provide timely guidance and feedback to students in groups with learning difficulties, which will help students to achieve a higher level of cognition in flipped classroom.

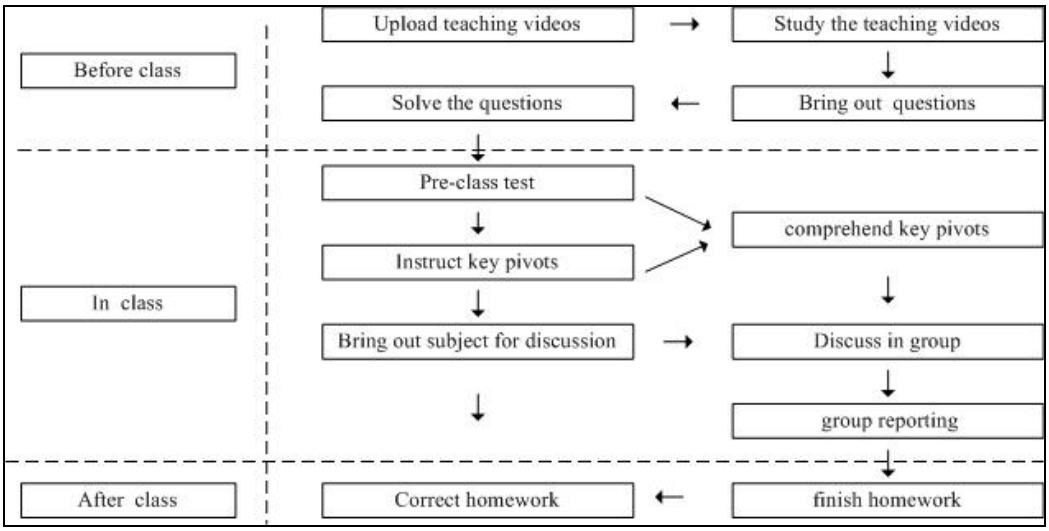

Fig. 1. Implementation model of flipped classroom

IV. ADVANTAGES OF FLIPPED CLASSROOM

Although the flipped classroom model has been widely accepted by educational researchers and practitioners, it's now developing and there are still some confusions. Flipped classroom is different from online video courses. In terms of composition, online video courses are only parts of the flipped classroom. In addition, flipped classroom emphasizes more interaction and in-depth learning activities. Compared with other teaching models, especially traditional teaching methods, the advantages of flipped classroom are mainly reflected in the following aspects:

A. Flipped classroom helps students who are relatively weak

In the traditional teaching model, in which teacher is the center of the class, teachers pay more attention to the students who perform better. Mainly for the reason that they can

quickly understand what the teacher says and give positive feedback and interaction. But in flipped classroom, everyone can watch the teaching videos repeatedly until they understand them. And in classes, teachers can give more corresponding guidance to the students who are relatively weak.

B. Flipped classroom helps teacher to understand the students

The relationship between teacher and student is an important factor that affects students' learning outcomes. A good teacher is often able to establish a good relationship with his students. In flipped classroom, the teacher has more opportunities to communicate with the students, and it works in helping teachers to get to know their students. The most importantly, it is beneficial to improve the teaching effect.

C. Flipped classroom helps students arrange their time more reasonable

At present, college students usually participate in varieties of activities except completing the study tasks. These activities conflict with learning tasks sometimes. The flexibility of the flipped classroom help students rationalizes their study work and other activities. Through pre-class preparation stag and consolidation after classes, students achieve the progress of both studies and their practical abilities.

D. Flipped classroom helps to improve teaching interaction

The biggest advantage of implementing a flipped class is that it increases the time between teachers and students. In flipped class model the main task of teachers is no longer confined to classroom teaching, but focused on one to one communication with students about their questions.

V. PROBLEMS OF FLIPPED CLASSROOM

The biggest difference between the flipped classroom and the traditional classroom is that the lower level of awareness is learned before class. For the higher cognitive level content, according to the guidance of the teacher in the classroom, students learn to acquire through cooperation with their classmates. This is one of the main objectives of the flipped classroom. In the course of the practice, this problem has also been verified. The ability to learn knowledge of reaching a high level of awareness is a positive and meaningful thing for students. But there are also higher requirements for students 'learning and cognitive skills. For most of the students in auxiliary machinery flopped classroom, there are some problems.

(1) Some students reflect that "the information provided before class is too simple to meet self-learning needs." We learn from simple to complex. First, we learn a simple theory. Through judgment and thinking, we can use simple theoretical knowledge to practice and become familiar with it. In pre-class preparation stage, the information provided to students is simple and understandable. A deeper understanding of the knowledge requires students to study and judge independently.

(2) Some students say they don't like the learning styles of flipped classroom, and they just want to listen to the teacher quietly. Few students only listen to the teacher in the class and do not participate in the group-discussion. Some students point out that the teacher explained too quickly in class. They can’t understand the lesson well. The difference of students' cognition causes that some students can’t actively participate in learning.

VI. CONCLUSIONS

With the arrival of higher education era in China, the number of students in universities is growing rapidly day by day and the learning styles of students are also becoming more and more diversified. Flipped classroom can satisfy most students’ needs. By application of flipped classroom on auxiliary machinery, we get conclusions as follow:

(1) Compared with traditional classroom, the flipped classroom can effectively stimulate the students ' activeness and enthusiasm.

(2) Compared with traditional classroom, the flipped classroom can improve the students' cognitive ability.

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