

Analysis and Design of Flipped Classroom Model Based on Project Teaching Mode*

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Abstract—The combination of project-based teaching and flipped classrooms has provided new ideas and methods for the teaching in our country especially non-governmental colleges and universities. With new ideas and new technologies are emerging, the combination of online and offline courses has not found the most appropriate teaching method. The concept of flipped classroom teaching was integrated into project-based teaching. Under the project-based teaching model, the teaching methods, teaching design, implementation process of flipped classroom were explored in-depth.

Keywords—*project teaching; flipped classroom; autonomic learning*

I. INTRODUCTION

The flipped classroom first appeared in an application in a high school in the United states, it is a newly emerging way to make up lessons for those student who are absent from classes using screenshot software to make PPT. However, surprisingly, this method of make-up a missing lesson has an unexpected effect, because of this teaching method; many students do not have to spend more time. Listen to the teacher's explanation of conceptual knowledge in class. Put the study in the normal classroom in front of the classroom study. The teacher should record the lectures in advance, load to the network platforms .so that students can autonomously learn them through the network platform. The students will bring up the points of problems and obtain the best teaching effect by asking questions in class communicating, assisting learning and other series of class activities.

In foreign countries, many primary and secondary schools, in the implementation of the flipping classroom, first change the teaching environment, replace the rows of traditional desks and chairs with tables and sofas. The school calls this environment" informal" learning environment. In this "informal" learning environment, students can break the constraint, "the fast-paced environment, and atmosphere students' performance is also getting better and better." And

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it is in the rapid development of educational informatization.

Today, with the rapid development of educational the way of spreading theoretical knowledge is more extensive, the teacher should also change from original content-teaching to helping students to understand, absorb and apply knowledge, so as to continue to learn and renew the existing teaching methods to adapt to the requirement of development of education. The concept of flipped classrooms was well-received by all the teachers and educators once being put up, which was first applied in the education of primary and middle schools, then with the better response, flipped classrooms gradually get into the university undergraduate education course, such as in English and computer classes, combined with flipped classes and MOOC Classes, will get popular among students, who thick this method will let them experience the freer experiments and more relaxing classroom atmosphere. The pattern of flipped classrooms will get higher education into educating the ability of student to learn and to apply.

II. THE PRESENT CONDITION OF THE DEVELOPMENT OF PROJECT-TYPE TEACHING METHOD

The so-called Project teaching method is to combine the traditional book theory knowledge with the practical teaching in the form of the project. It divides the contents of the traditional discipline system into several relatively independent teaching projects for students to accept, each project has a number of tasks, Teachers will explain the teaching projects and decompose it in details during the teaching process, then the students work together to complete the task of each group. Through the division of labor to complete project tasks, students not only mastered the knowledge in the summary evaluation in the process of participating in the project implementation .It not only realizes the teaching aim "people do, I learn, people learn, I can, people can I'm better", but also improves students' independent learning goals, cultivates students' divergent and subjective thinking.

The main purpose of project teaching method is to combine theory teaching with practical cognition stimulating students' curiosity, enhancing the initiative of learning. Although it is suitable for some professional courses with strong practical and theoretical knowledge, it will encounter some questions in the real teaching implementation process.

A. *Too Much Repetition of Course Content*

The project teaching method divides the content into several subprojects, there will be the intersection of new and old knowledge and repetitive learning in each subproject, such as repetition of knowledge points learning. Compared to the traditional teaching methods, the classroom time will be tight. Therefore, it's necessary to arrange time reasonably and effectively to improve the utilization efficiency of class time.

B. *The Teaching Content Needs to Be Adjusted*

At any time, teachers play the dominant role in the tradition teaching method classroom. The Project teaching method is to complete the task of learning through division of labor in each group. However, the degree of difficulty of tasks in each group is different; the progress of teaching in class needs to take into consideration of the comprehensive learning level of each group, project schedule and ability of accepting knowledge. Students are divided into groups according to the level of learning and teaching capacity, which needs to be adjusted according to actual teaching schedule.

C. *Doubling Teaching Preparation Work Load*

Compared to prepay lessons before class and teaching lessons in class of traditional teachers. The Project teaching method is student-centered; teachers observe the progress of each study group carefully, talk about students' problems and explain the difficulties in their learning. It's intangible for teachers to have higher requirements for their knowledge reserves and adaptability. In the preparation before the course, teachers should look up as many teaching materials as possible and get familiar with them in order to increase the breadth of knowledge and enhance the ability to operate.

III. THE APPLICATION OF FLIPPED CLASSROOM IN THE PROJECT-BASED TEACHING METHOD

A. *The Integration of Modern Teaching Methods and Foreign Teaching Models*

Formerly, there are mainly two views about teaching video: the one is to choose excellent open educational resources which are advantageous to save time and energy. However, many existing educational resources do not accord with actual teaching objectives, which is the biggest drawback. Therefore, it shouldn't be adopted. When use the flipped teaching model based on project-based learning, teachers should record the teaching video which includes sounds and blackboard-writings by themselves, conforming to the teaching content and the teaching objectives. The design of the video should be emphasized on some elements such as interactivity and divergence. Besides, the time of the video should be limited in about 8-10 minutes so as to avoid that the video is too long to catch the attentions of students.

B. *The Utilization of Social Media in Communicating and Mentoring*

Students can prepare lessons before class through watching videos independently. Communicating in the social media can also assist students to study, for example, students can discuss the questions they have met in the preview and try to solve them with the help of each other. What's more, teachers can mentor someone individually on the message board, meanwhile, they can know how much the students have learned for the first-time learning, which, promotes the teaching effect better.

C. *The Development of Cooperative and Inquiry Activities*

It is necessary for undergraduates to learn the operation of professional skills and the knowledge of professional theories. University is the place mainly for learning knowledge, and fundamentally, our purposes are to learn the more profound professional knowledge and to expend our knowledge reserve actively. However, nowadays the class attendance of the students is quite low, and few students really study in class. Our knowledge reserve includes not only professional knowledge, but also other humanistic and natural knowledge. Every student has the ability to study independently, and the whole learning process is to cultivate students' independent minds and their independent learning abilities. Teachers should pay attention to foster students' ability in independent learning, through the way which students can systematize and internalize the knowledge to build their own knowledge system. It is also a good assistant learning method to divide students into groups to launch inquiry activities. In the project-based learning, each group has their own inquiry theme, and in the process of the preview-learning-feedback, all members of each groups not only need to express their ideas actively but also to communicate with each other positively, at the same time, achieving the learning objectives of their groups cooperatively. Meanwhile, teachers should also observe every group carefully and give them some suggestions at any time.

IV. DESIGN FOR INSTRUCTIONAL MODEL OF FLIPPED CLASSROOM

A. *Principles of Flipped Classroom Model*

1) *Establishment of the flipped knowledge model:* Constructivism emphasizes to discover and perform meaning construction from the environment, rather than unilateral knowledge infusion, namely it is not obtained by teachers to teach in the classroom, but will be completed before transfer of knowledge in the classroom, the students with the questions in the classroom, through the communication between teachers and students in classroom, collaboration and other activities, it is a learning process of active exploration. The main character of the class is transformed from the teacher into the student, stimulating the subjective initiative of the students to learn, and better reflecting the student's main position, thus better completing the construction and internalization of knowledge.

2) *The support of network technique:* Whether the flipped class can be realized or not, the support of network technique occupies an important proportion, for example, micro lesson, moody class, one to one network teaching and so on. Because teachers need to process courseware on the web firstly, and then upload. This teaching mode is based on the popularization of Internet and the application of network information technology, which breaks the requirement of time and space in traditional education field and turns the traditional classroom teaching into an open learning environment indeed. For instance, the online class, which is vigorously being promoted to apply in China at present, just has solved many problems of traditional learning mode, such as time and space constraints. Online class is a communication tool that builds a real-time online interactive system on Internet, using the network to deliver video, sound, and images in real time between users of two or more locations. The users who communicate in the class can publish text and voice conversations through the system, observe video images of each other, and display files, drawings and other objects in electronic form on the whiteboard. Users who communicate in class can publish text and voice conversations through the system. Meanwhile they can also observe video images of each other, and display files, drawings and other objects on the whiteboard in electronic form. Besides, people who participate in communication can also annotate whiteboard and share whiteboard content at the same time and the effect is the same as the class opened at the same time. It highlights the freedom of learning time and the freedom of learning place." Without running round, without gathering together, just open the computer and learn as long as you want to", this advertising word can describe the educational mode of online class practically.

3) *Hierarchical teaching:* The traditional classroom teaching content adopts a unified teaching model and teaching organization. According to the cognitive load theory, the basic students think it will waste time, the cognitive load are too low. The students with poor foundation have high cognitive load and difficulty in learning. Therefore in the process of turn through the implementation of the classroom, the students can be repeated many times before class learning, through the relevant electronic learning resources based on the basis of, can be repeated many times before class learning, both to achieve the new teaching target of layered, grading, also don't have to worry about an omission of a point of knowledge in the teaching process.

B. The Implementation Process of "Rolling-over Classroom" Based on Project Teaching Model

The project of rolling classroom needs the following stages: teacher preparation, students' autonomous learning, classroom communication and after-school feedback.

Teachers, as the major speakers and guiders of the course, need to complete enough preparations before class. First, I divide the content into two parts, and we can complete the learning content and save it through the mobile phone client or computer before class. Then upload teaching courseware and teaching materials to maximize support and help for students' autonomous teach before class. In addition, the teacher how to guide students to learn before class and how to guide them in class is also very important.

The students, as learners, mainly study independently and complete the related exercises by the network learning platform in accordance with the corresponding chapters before class, and fill out the questions that do not understand in the feedback column. At the same time, some students with strong learning ability can complete the study and development of the divergent practice. In addition to learning, before class, you can also make good use of network environment such as WeChat, micro-blog and QQ to communicate. Students can find some problems through self-study before class and feedback these problems to the group leader of the learning group in the project, so that the teacher can know something about the mastery of students' knowledge before class.

At the stage of class, mainly focusing on face-to-face teaching, and examines the learning effect of the network terminal in the form of problem guided, and concentrates on the problems encountered in the various learning project groups. Finally, feedback is carried out in the form of group discussion. For instance, giving students sufficient practical opportunities to practice demonstration and report, which enables students to truly digest, understand and utilize theoretical knowledge. In the end, teachers should systematically sort out knowledge points according to their acquaintances of learning, so as to consolidate students' autonomous learning effect.

In the part of class consolidation, after commenting about the situation of each group in completed project ,teachers give out an extra assignment by the way of collecting more extending learning resource about teaching content. This assignment is for the upper students who have more time for learning to consolidate and develop skills they have learnt.

V. CONCLUSION

Contrast to traditional classroom, the teaching project of flipped classroom has more complex teaching content. But under the pattern of new media, having been learning knowledge and skills consciously before class, students receive enough time for their discussion in class.

In a word, there are many merits both in the way of flipped classroom and traditional classroom. During the process of practical teaching, they all exist and combine with each other. On the one hand, the flipped teaching through project may make up for a deficiency in traditional teaching. On the other hand, the limited pattern of flipped classroom, which is based on project teaching, can be broken. It can provide more beneficial condition to the execution of new type of teaching method.

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