

## A Research Overview on Flipped Classroom at Home and Abroad

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**Abstract.** In recent years, a kind of teaching mode which stimulate students autonomous learning ability -Flipped Classroom-arises at the historic moment, the basic process is: Teachers released in videos on teaching content or new knowledge by the information technology and layout related task before class, students completed and submitted before the class; In class, teachers give priority to the internalization of knowledge and skill training. They mainly provide cooperation, exploration and interaction to help student's complete real independent learning. From the perspective of theory and practice, this paper summarizes the research results of FC at home and abroad, so as to provide references for the further research of FC.

### Introduction

Flipped Classroom (FC) originated from Colorado Woodland Park High School. In order to help the students absent from class, two chemical teachers Jonathan Bergman and Aaron Sams overturned their teaching practice, handing out teaching video and materials before the class, discussing and finishing the homework in class. This was the original FC model, and Bergman and Sams were called pioneers of exploring FC.

The quickly and widely spreading of FC model benefited from the Salman Khan-the founder of Khan academy, who made more than 4400 pieces of teaching video, covered various of basic education discipline, Many teachers use these videos for implementing flipped classroom .Many scholars have made a beneficial exploration of FC, seeking for the right model that is suitable for the specific discipline at the specific teaching stage. From the perspective of theory and practice, this paper summarizes the research results of FC at home and abroad, so as to provide references for the further research of FC.

### Abroad Research Overview

Back in the 1990s, Eric Mazur, a professor of physics at Harvard University, created Peer Instruction and integrated it with flipped learning. He divides learning into two stages: the transmission of knowledge and the internalization of knowledge. The concept of FC was first explicitly proposed at the 11th International Conference on University Teaching in Florida in 2000.

In recent years, foreign researches on flipped classroom have developed rapidly both in theory and in practice. At present, most of the relevant theoretical research and teaching practice are mostly around four aspects, namely the concept of learning, the use of video carrier, construction of the teaching model and the teaching effect evaluation.

The main idea of FC-a new teaching model-is to stimulate students' learning initiative and build their own knowledge system. This model trains students to study, explore new knowledge, propose hypotheses and test hypotheses, testing their learning effect through a series of learning programs, stimulate their enthusiasm for learning. Pierce and Fox (2012) believe that the application of FC can stimulate students' learning enthusiasm and improve their learning enthusiasm.

It is obvious that the main purpose of FC model design is to cultivate learners' active learning ability, which also runs through all kinds of plans inside and outside the class to ensure the consistency of learning.

Educause (2015) pointed out that the video is one of the most important element in the classroom, after watching the related teaching video before class, students will be more interested in the contents, they also don't have to take much notes. Thus saving much time for exercising their advanced thinking ability more effectively.

Boyer (2013) pointed out that, with the aid of multimedia tools, the learners will get a more intuitive understanding of basic concept and knowledge that will be more impressive, they quickly apply him to the classroom learning activities. Teachers can also provide timely support to students, monitor their learning progress, and find out their learning difficulties. The effectiveness of flipped classroom depends largely on the degree of student involvement in video learning. Muldrow (2013) studied the learners attentions on FC, he points out that the check on students notes can motivate them, and suggested that the students should use the Cornell system to take the notes.

Constructing flipped classroom teaching model is the key of flipped classroom practice. Due to different information platforms and inconsistent practical results, foreign scholars have studied the construction of flipped classroom teaching model. Jackie Gerstein (2001) created a "ring four phases" teaching model in America, this model is based on a "4 mat" teaching mode, mainly studies how teachers should carry out the classroom teaching interaction in a FC, and designed the detailed solutions to provide reference for practical teaching activities. According to his teaching experience, Robert Talbert (2012) summarized the process and links of a FC teaching model, but the practice proved that this model was not applicable in liberal arts teaching. With the aid of teaching materials such as pictures, video, animation, Riverside Unified School District carry out a Immersion Program of FC, giving students more participation, and resulting "Riverside Unified School District Model".

As far as teaching effect is concerned, many studies believe that flipped classroom can improve students' learning efficiency. It enhanced the consciousness of the students' learning satisfaction and motivation of autonomous learning, at the same time, teachers also have more evaluation basis for students and pay more attention to students' individualized differences. Compared with traditional classrooms, students in flipped classroom can master math knowledge more accurately and spend less energy. In addition, flipped learning give learners more sense of achievement and more recognition of their learning environment, thus reducing the teaching pressure of teachers. In terms of improving academic performance, Day and Foley (2006) finds those students in flipped classroom have higher academic performance and homework completion than students in traditional classrooms. Winqvist and Carlson (2014) introduced FC into the introduction to statistics course and conducted a one-year teaching experiment. They compared test scores and found that scores students get in the part of flipped is much higher than those in the traditional teaching, and there is no obvious difference in the part which is not flipped.

Reviewing the research status of flipped classroom, it can be found that flipped classroom has been widely recognized and practiced in foreign educational circles. Many schools have explored many unique FC models in the process of practicing flipped classroom and applied them to improve students' learning ability and reflective ability.

## **Domestic Research Overview**

### **The Research Stages**

In recent years, domestic scholars also began to fumble the FC teaching mode. By 2018, there were 13 journal papers with the title of "flipped classroom" as the search term, in 2012, 78 in 2013, 535 in 2014, 1951 in 2015, 3,536 in 2016. Literature review shows that Chinese scholars have mainly gone through the following three stages in their research on flipped classroom. 2012 was the introduction stage of flipped classroom theory, which was mainly the research and introduction of theory and cases, the beginning of the research on FC in China. Through researching the origin, concept and basic features of the FC, Zhang Jinlei (2012) build a classroom teaching model, and analyzes the challenges in the process of implementation of teaching practice, providing the reference for China's flipped teaching practice.

A lot of design and application research on FC appear in 2013-2014. Through the teaching experiment in the education technology professional English course, Wang Xiaodong (2013) found the application to FC can not only improve the students' academic performance, but also promote students for esteemed courses teaching, and put forward the application of FC teaching process. Zhai Xuesong (2014) selected 158 undergraduate students from 17 majors of Hefei Normal University and Anhui Jianzhu University as the research sample. The teaching sampling project is a public course of college English, thirty-four items of students' satisfaction with the flipped classroom model in Europe and the United States were measured, and factor analysis was carried out to obtain three common factors, namely, learners' expectation, perceived quality and perceived value. The analysis shows that learners' satisfaction evaluation of FC is influenced by the three common factors. At the same time, the influence mechanism of each common factor is analyzed, which provides data support and reference for the practice and theoretical model establishment of FC in China's higher education.

By 2015, considerable reflective literature on flipped classroom had emerged, reflecting on the feasibility, value and teaching effect of flipped classroom. Lu Qiang analyzed the reasons why the implementation of FC was not effective as early as 2013, the main reason of the teaching practice effect has not been improved obviously is resemblance in form rather than essence. He suggested to reposition the role of teachers and students, refine the video of curriculum teaching and rebuild the classroom dialogue for the purpose of truly realize the FC. Li Xiaomei point out the mechanical and blind imitation of FC make more and more embarrassing phenomena emerge. If teachers only explore teaching methods instead of teaching content suitable for "flipping", the teaching effect is very limited.

After completing the flipped practice of college English courses. Li Nanjing point out the application of information technology is not the fundamental advantage of flipped classroom. The improvement of the overall teaching model brought by technological development is the key point of flipped classroom teaching model. After combining the case study of the application of flipped classroom in China, Zhu Zhiting (2015) proposed the implementation of FC should break through the solid state of resemblance in form rather than essence and inevitably face a series of problems. Such as the application of micro-course, the quality of students' independent learning before class, the cultivation of students' advanced thinking ability in class and the reserve of teachers' professional quality, etc.

### **Practical research on flipped classroom in China**

Many primary and secondary schools in China have started practical research on flipped classroom, for example, teachers in Changle No. 1 Middle School in Shandong province made a FC practice .The information technology were integrated into the curriculum objective, curriculum resources, curriculum structure, curriculum evaluation and other aspects. They also create a local FC model "Er Duan Si Bu Shi Huan Jie". In 2013, empirical research on flipped classroom in Peiben Experimental Primary school in Kunshan city confirmed that flipped classroom can not only improve students' academic performance, but also promote the development of students' comprehensive quality.

### **Conclusion**

In a comprehensive view, it is found that many schools in Europe and America have applied FC to teaching practice and achieved good results. Some schools in China also carried out practical exploration of FC. It poses great challenges to traditional classroom knowledge view, teaching view, teachers' teaching ability, teaching mode, teaching evaluation, teacher development and teaching system. Its core points to the effective teaching problem of FC. What are the structural dimensions of effective flipped classroom teaching? How to evaluate the effective teaching of flipped classroom? What are the influencing factors and interaction mechanism of flipped classroom effective teaching? What intervention programs should schools adopt to effectively promote effective flipped classroom teaching?

The current researches on FC are mostly theoretical and less empirical. Most of the research stayed on the "process - result" model, the research on environment variable and comprehensive influence mechanism research is not enough, For different types of flipped classroom models or methods, No studies have been done. How can the effective teaching goal of FC be reflected in the teaching evaluation standard? It is an important issue to promote teaching through evaluation, and provide a reference system and road map for sustainable development for teachers' teaching improvement, reflection and independent development. It is also a direction to be further studied and explored in academic circles.

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