

# Analysis of the Influencing Factors of the Flipped Classroom Model in the Implementation of Teaching Application in Colleges and Universities

Yu Wang<sup>a</sup>

## Abstract

Based on the in-depth analysis of the advantages, characteristics and cases of the SPOC platform and flipped classroom in China, this study constructed a course of communication principles based on the SPOC platform. Through the investigation and research on the factors that affect the teaching of computer specialty in colleges and universities, the following conclusions are drawn: 1. School: University leaders attach great importance to the computer courses of computer specialty, but the teaching management needs to be further improved. 2. Teaching factors: Some colleges and universities are short of social adaptation and scientific research requirements in the computer courses offered by computer majors. 3. Teachers: The teaching staff of computer courses in colleges and universities are becoming younger and more highly educated, with the characteristics of young teachers with high technical level and senior teachers with high titles.

**Key words:** Flipped Classroom, Model; Influencing Factors; Teaching Implementation

## Introduction

Since the worldwide popularity of flipped classroom in 2011, educators around the world have actively carried out research on flipped classroom, and papers on flipped classroom research have shown explosive growth. In 2011, flipped classroom began to be widely promoted in the United States. In April and July of that year, flipped classroom conferences were held to explore its essence.

Flipped classroom fully integrates the characteristics of contemporary education towards internationalization, informatization and individualization. It quietly changes the traditional classroom teaching structure with its characteristics of mobility, openness and autonomy, while gradually weakening the importance of traditional classroom teaching. Therefore, flipped classroom is a hot topic worthy of attention at present. Under the background of global digital development, domestic classroom teaching is lagging behind obviously, and the disadvantages of traditional teaching mode are obvious.

This article mainly through the literature research method and content analysis method, has carried on the analysis to the university turnover classroom. This paper analyses the characteristics and development trend of flipped classroom

research from the aspects of research fields, research topics, research methods, literature sources, author information and references. The result of the study explores the value orientation, research focus and methodological characteristics of flipped classroom research from both vertical and horizontal aspects. Especially, teachers deal with students and teaching content, and organize learning tasks and teaching activities.

## Literature review

### 1. Flipped classroom

In the classroom, through group discussions, teachers answering questions and solving puzzles, collaborative discussion to solve problems, to achieve knowledge internalization. Enfield, J. (2013) New teaching methods based on information technology change have subverted the tradition of in-class knowledge learning and in-class training. From Zhu Zhiting's point of view, whether at home or abroad, reversing the teaching process of classroom practice to carry out reverse innovation has become a hot spot of educational informatization. Inverse innovation in teaching process can not only impart knowledge in advance, but also bring about changes in knowledge internalization. The essence of this practical innovation is to help students improve the depth of learning, problem-solving ability and cultivate their higher order thinking ability. Basile (2013) thought that flipping classrooms was educational

*a. Corresponding Author. College of Architecture and Engineering, Tianfu College of SWUFE, Mianyang 621000, Sichuan, China. Email: wangyu1@tjswufe.edu.cn.*

practice innovation based on modern information technology. It not only places learners in a central position, but also fully respects some individual choices that support students. This kind of educational innovation is actually in line with contemporary demands for education. The characteristics of flipped classroom are mainly embodied in four aspects: teaching subject, teaching resources, teaching carrier and teaching process. Specifically speaking, it is a multi-dimensional dynamic negotiation in the teaching subject, and more attention is paid to the integration, comprehensiveness and sharing of teaching resources in the teaching resources. Wageman, J. (2014) insists on innovation, efficiency and three-dimensional in teaching carrier, and focuses more on teaching autonomy, flexibility and controllability in teaching process. In the field of education, owing to the continuous application and innovation of modern information technology, it has become a general trend to realize individualized service and high-quality teaching in the classroom. Therefore, it is not only helpful for us to realize the individualization of classroom functions and high-quality service, but also provides the best conditions for the optimal development of our "teaching" and "learning". Zhao, C. (2014) argued that in order to be different from traditional teaching, the "flipped classroom" must be reversed in the following aspects. Teaching management has been reversed. The traditional teaching mode used to be "school management". Now we pay more attention to self-management and become a "home-school co-education" management mode. At the same time, we have also changed from "teaching management" to "learning management".

## 2. Hybrid learning theory

Scholars believe that learning is a complex process, and everyone is not just a learner who follows a single model. Susanne GerhardtSzép(2012) proposed the Khan's Octagonal Framework for hybrid learning, which includes eight elements: institution, teaching, technology, interface design, evaluation, management, resource support and ethical elements. These eight elements are interrelated and interdependent. Effective learning requires the effective operation of these eight elements, and the improvement of students' learning efficiency requires teachers to use mixed programs and integrate multiple media for teaching. Vaughan, M. (2014) pointed out that China's educational thought. Ma Zhiqiang and others believe that the domestic research on hybrid learning dissertation mainly focuses on the curriculum level in the field of higher education. In

terms of research methods, there are great differences between domestic and international dissertations in the number and dimension of research on intention and interactive topics.

## 3. The application strategy of "flip classroom" in computer professional education and teaching.

The micro-video of "Flip the Classroom" can be said to be both valued and not valued. It is said that micro-video is the "standard" of "flip classroom". There is no video, not "flip". These methods are instilled. In the traditional computer professional class, instilling too much cannot win the hearts of students, let alone in front of the computer screen. Students' interest in learning can't be effectively stimulated, and the effect of self-learning before class may be discounted; Verleger M (2014) directly tells the main content of the original class in the micro-video, and the sentiment becomes a memorization, and then in the classroom. The Rivera E (2015) guidebook and micro-video are not overlapping. Some teachers present the traditional guidebook as the content of the micro-video. Obviously, they missed the opportunity to improve the quality of self-study before class. The biggest difference between computer science and science is the richness of link materials. A text in computer professional textbooks often has a large number of related appreciation texts. Lai YC (2016) is in the "flip classroom", teachers should Very familiar, presented to the students in the guide case, let the students to contact the multi-faceted interpretation of the article, the students are more in-depth and thorough understanding.

## 4. Impacts of emotions, attitudes and values of "Flipped Classroom" in colleges and universities

Emotions, attitudes and values are the main components of curriculum objectives. Educators and scholars at home and abroad have endowed them with rich connotations. Verleger, M. (2013) believed that emotion is the most real psychological reaction that an individual displays through his personal feelings of the things around him, such as love, happiness, disgust, sadness, etc., students like this course and are interested in it.

They interact and integrate with each other. They can neither see them separately nor confuse them. This kind of research generally starts from a specific discipline in colleges and universities and studies the strategy of "flipped classroom" in this discipline and its impact. Since MIT Open MITOCW, a number of universities, organizations or individuals have emerged abroad to construct open teaching resources. Howell, T. H. (2015) By using screen capture technology to teach online,

students can choose the time and place to study course materials at will or stop at any time.

## Research method

### 1. Research methods

#### 1.1 Questionnaire sampling method

For 10 schools randomly selected from the main urban areas, there are two key schools, and the rest are non-key schools. They randomly selected all the teachers in the school as the research object. Following the rules of scientific research methodology on questionnaire design, and on the basis of experts' opinions and suggestions, the final questionnaire for students was formed through repeated revisions. 560 questionnaires were collected, the recovery rate was 93.33%, 548 valid questionnaires, the effective rate was 91.3% (as shown in Table 1).

Table 1. Recovery rate and efficiency of the questionnaire

	Issue questionnaire	Recycling questionnaire	Recovery rate	Valid questionnaire	Effective recovery rate
Teacher	24	21	95.43%	20	90.9%
Student	600	560	93.33%	549	90.9%

#### 1.2 Literature method

In order to evaluate the factors affecting the overall and curriculum development, this paper not only consulted the literature of pedagogy, but also collated and analyzed the literature of sociology, statistics, psychology, philosophy and other possible related fields. And there are 808 carefully selected papers on teaching content. In order to keep up with the times, we have also learned and paid attention to the latest developments in curriculum development from the Internet and other channels.

#### 1.3 Mathematical statistics

According to the data obtained from the

experiment, the necessary statistics and calculation of the relevant data are carried out by using Excel software with conventional statistical methods.

### 2. The characteristics of the research measures in the flipped classroom

#### 2.1 The change of teaching structure

The student's learning process consists of two parts: "accepting knowledge" and "knowledge internalization". In traditional teaching, teachers usually teach knowledge in class. Students consolidate the knowledge in class by doing homework after class, so as to achieve knowledge internalization. Teachers only teach for teaching, centered on teachers' teaching content and students' knowledge.

#### 2.2 The change of teachers' role

In class, by communicating with each other, displaying learning results, exploring activities and timely individual tutoring in class, students can complete the construction of knowledge, find problems and solve problems, adjust classroom tasks in time according to the feedback information from students and classes, and teachers change from knowledge imparters to classroom organizers and designers.

## Analysis result

### 1. Multimedia teaching platform

The main content of the teacher in the pre-course period is to check the content of the student's reply in the classroom exchange area to understand the students' knowledge of the knowledge points. In addition, the teacher passes the student's learning progress recorded in the background to the students. Keep abreast of the learning situation to better supervise and manage students. The platform is shown in Figure 1.



Figure 1. Video urges learning

Students need to learn the teaching content on the multimedia platform in advance with questions. This includes watching the learning instruction video, watching the learning PPT content, completing the classroom test appearing in the video, and conducting online communication in the discussion area, as shown in Figure 2.

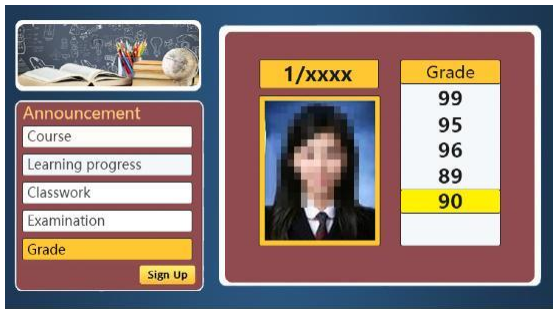


Figure 2. Topic discussion interface

Under the background of online learning tools, students, teachers, schools and society face unprecedented opportunities and challenges. We need to have the spirit of continuous improvement and continue to learn to do better. Students can watch their progress, as shown in Figure 3.

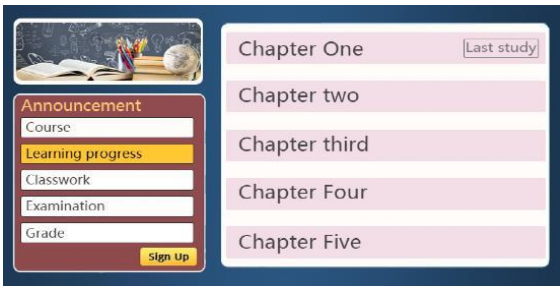


Figure 3. Shows the progress of the icon display

Nowadays, the classroom is no longer a place for teachers to carry out one-way knowledge transfer. Flipping the classroom provides an opportunity for personalized learning, enabling each student to realize their own learning needs and freeing teachers and students so that they can focus on the interests and needs of more students.

2. Comparison of teaching ideas

Teaching idea is the soul of teaching mode, which reflects the human nature and scientific nature of teaching. A good teaching idea usually attaches great importance to students' principal position in teaching activities.

Table 2. Comparison of traditional classroom and flipped classroom teaching theory

Teaching idea	
Traditional classroom in colleges and universities	Student-centered and teaching-oriented
Flipped classroom in colleges and universities	Take the students as the center, attach importance to the student subjectivity, and set the teaching by learning

The teaching philosophy of college computer majors flipping classrooms is taking students as the center, paying attention to the subjectivity of students, and changing from "teaching and learning" to "study by learning".

3. Determination of the main public factors

According to the questionnaire related to the flipped classroom curriculum, the R-type factor of 21 variables was studied, and several related data were obtained. According to Kaiser's method, eight principal factors with eigenvalues greater than 1 are selected, and the cumulative contribution rate reaches 69.282 (as shown in Table 3), which can generally represent the total amount of information.

Table 3. Questionnaire characteristic value table of influencing factors on the implementation of flipped classroom course

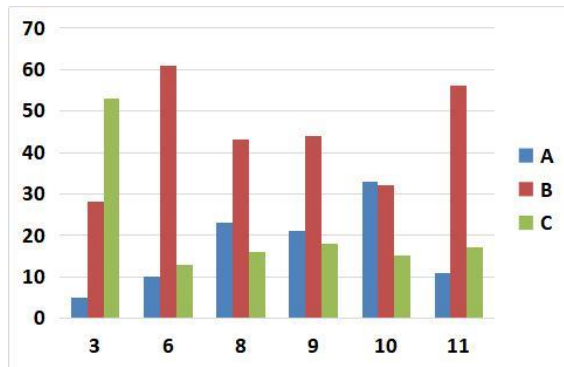
FACTOR	CHARACTERISTIC VALUE	CONTRIBUTION RATE%	ACCUMULATED CONTRIBUTION RATE%
1	2.956	14.076	14.076
2	2.451	11.671	25.747
3	1.976	9.410	35.157
4	1.764	8.400	43.557
5	1.518	7.229	50.786
6	1.463	6.967	57.753
7	1.357	6.462	64.215
8	1.064	5.067	69.282

On the basis of determining the main factors, eight original variables are classified according to factor analysis theory. In order to make each column factor transform into two poles as far as possible, this paper uses the "maximum orthogonal rotation method" to transform all kinds of factor loads into 14. The factor loads above 0.55 level are classified. Eight original variables are classified into three main factors.

4. Analysis of main factors

The computer major that flips the classroom is different from the other courses that students learn in school every day, whether it is the form of teaching or the timing of teaching. Compared with other courses, the flipped classroom pays more attention to the time link and the students' practical ability. Its curriculum features include: (1) operability, that is, the realistic possibility of flipping classroom teaching. (2) Harmony, that is, mainstream values. (3) the degree to which the behaviors are consistent.

(4) Relative superiority, that is, the advantages and disadvantages of flipping the classroom compared with other computer courses.



**Figure 4.** The influence of teachers' emotional attitudes and values on single-turn classroom teaching

It can be seen from the above column chart that the following conclusions can be drawn through the investigation and study of the factors affecting the computer professional teaching in colleges and universities: 1. School: University leaders have a certain degree of emphasis on computer professional courses, but teaching management needs to be further improved; the number of people in some computer majors is too high. 2. Teaching factors: Some colleges and universities in the teaching objectives of computer special courses lack the target requirements of students' social adaptation and scientific research.

### Discussion

The reform of new curriculum standards is an all-round and important change in the history of curriculum reform in China. However, as far as physical education is concerned, the new curriculum standard is quite different from the previous one in terms of the name of the curriculum, the concept and the goal of the curriculum. The direction of the reform of the new curriculum standard is to face all countries in the world, aiming at linking up with the advanced international curriculum level. Since the reform of the new curriculum standard, the harmonious and relative superiority of the flipped classroom has been improved obviously, but these are only staying in the theoretical level of curriculum optimization.

### Conclusions

Through literature analysis and practical research, we find that for some humanities courses which need profound knowledge background, the traditional classroom can achieve better teaching effect through teachers' guidance and students' mutual discussion. The flipped classroom model is

more suitable for science and engineering courses with clear knowledge points and easy to be extracted, such as computer and multimedia courses, biology, chemistry, mechanical engineering and electrical engineering. There are different disciplines for flipped classroom.

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