

Research on Professional Learning Based on Flip Classroom Teaching

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Abstract: The tilted teaching style is a common and effective way to improve students' learning ability. It is also a commonly used teaching method in the comprehensive and applied colleges. In particular, the professional curriculum flip teaching is to simplify the teaching process by simplifying the course content into various teaching styles, so as to improve the practical effect of the management mode in the classroom.

1.Introduction

Flipping the classroom-based teaching mode is to complete the knowledge learning at home. The classroom becomes a place for interaction between teachers and students and between students and students, including answering questions and using knowledge, so as to achieve better educational results. This is a term translated from the English "Flipped Class Model" and is generally referred to as the "Flip Classroom Teaching Model". The popularity of the Internet and the application of computer technology in the field of education have made the "flip classroom" teaching model feasible and realistic. Students can use high-quality educational resources through the Internet, instead of simply relying on the instructor to teach knowledge. The roles of the classroom and the teacher have changed. The teacher's more responsibility is to understand the students' problems and guide the students to use the knowledge.

The flip teaching style has been studied and researched by many experts and scholars at home and abroad since 2008, such as:2019^[1]Yan Xinhui;2019^[2]Wang Yang used video to implement teaching, and people have explored it many years ago. In the 1950s, the radio and television education carried out in many countries in the world is a testimony. Why did the explorations made in the past have not had much impact on the traditional teaching model, and the "flip classroom" has received much attention? It is because the "flip classroom" has several distinct features as shown in Figure 1:



Fig 1. Flipping classroom features

1.1 Video short and fine

Whether it is Salman Khan's math tutoring video, or Jonathan Berman and Aaron Sams's chemistry teaching video features are short and succinct. Each video is targeted at a specific problem, has a strong pertinence, and is more convenient to find. The length of the video is controlled within the time range in which the students' attention can be concentrated, which is consistent with the characteristics of the student's physical and mental development, and the video posted through the network. With a variety of functions such as pause, playback, etc., you can control yourself, which

is conducive to students' self-learning.

1.2 Information is clear and clear

The feature of the teaching video is that the only thing in the video is the hand, constantly writing some mathematical symbols, and slowly filling the entire screen, with the writing to explain the voice-over. This way of teaching makes people feel intimate, just like we are sitting in front of a table, learning together and writing the content on a piece of paper. This is the difference between flipping classroom instructional videos and traditional instructional videos. The video and the various items in the classroom will distract the students, especially in the case of students learning independently.

1.3 Reconstructing the learning process

The student learning process consists of two phases: the first phase is "information transfer", which is achieved through interaction between teachers and students, students and students; The second stage is "absorption internalization", which is done by the students themselves after class. Due to the lack of teacher support and peer help, the "absorption internalization" stage often frustrates students and loses their motivation and sense of accomplishment. The "Flip Classroom" refactored the student's learning process. "Information transfer" is carried out before the class, and the teacher not only provides videos but also provides online tutoring. "Absorption internalization" is completed through interaction in the classroom. Teachers can understand the learning difficulties of students in advance, give effective counseling in the classroom, and the mutual communication between students can help promote the internalization process of students' knowledge.

1.4 Review and detection is convenient and fast

After reading the instructional video, students understand the learning content, followed by four or five small questions to help students test in time, and students make judgments about their learning. If you find that several questions are not answered well, the student can go back and read it again and think carefully about what went wrong. Students' answers to questions can be aggregated and processed in a timely manner through the cloud platform to help teachers understand the learning situation of students. Another advantage of teaching video is that it is easy for students to review and consolidate after a period of study. The follow-up of the evaluation technology enables the relevant links of the students to obtain empirical information, which is beneficial to the teachers to truly understand the students.

2. Types and Advantages of Professional Flipping Classroom Mode in Colleges and Universities

2.1 classroom mode teaching method

Classroom teaching method is a commonly used practical teaching method. It sets goals according to professional content, teachers carry out professional resource allocation and guidance, and students conduct professional exploration and practice. The process of implementation in teaching is as follows: the teacher sets specific professional content according to the classroom teaching objectives, the students are divided into several groups to play different roles, accept different tasks, practice and complete professional activities, and display the professional completion results to teachers and other students. Teachers provide timely guidance and evaluation based on the student's completion. Because the professional teaching method is student-centered, it highlights the student's main position, and effectively exercises students' hands-on ability, active thinking and enthusiasm for learning. Therefore, professional teaching methods are widely used in applied undergraduate colleges.

2.2 Flip classroom teaching method

The flipping classroom originated from the United States, which advocated autonomous learning. In 2011, it was introduced into China's classrooms, and it was quickly promoted and explored by Chinese educators. Inverted classroom in short, by "teaching knowledge in the first class, then

practicing under the class, answering questions and doubts" flipped to "self-learning knowledge under the first class, practice operation in class, answer questions." Specifically, the teacher will teach the new knowledge content such as key points and difficulties to be produced into small video or small audio and other multimedia files, and send them to the students in advance. Students use the spare time to learn new knowledge by watching videos or listening to audio. Complete simple basic tests, record the incomprehensible aspects of your own learning, and walk into the classroom with questions. In the classroom, the teacher and the students jointly discuss and solve problems, thus completing the students' deep internalization and sublimation of knowledge.

2.3 Professional flip classroom and its advantages

In essence, the professional teaching method and the flipping classroom teaching method are to improve the autonomy of students' learning, stimulate students' enthusiasm for learning, and truly enable students to master knowledge and complete the use and internalization of knowledge. The two teaching methods have their own characteristics: the flipping classroom teaching method emphasizes the design of different teaching processes in the class, and the professional teaching method emphasizes the design of the teaching content of the students' operational ability. The two complement each other and complement each other and complement each other. In the application-oriented undergraduate colleges, the use of professional flip classroom teaching method can not only exercise the basic theoretical knowledge ability of students to learn independently, but also improve the hands-on operation ability of students through different professional exercises in the classroom.

2.4. Uniform specification for the use of professional flip classroom mode

2.4.1 Under the teacher to make course micro video or audio

The first step in professionally flipping the classroom is to reconstruct the curriculum system, and instead of teaching according to the traditional curriculum system, the curriculum is divided into different professional modules according to the actual situation of different courses, and the specific curriculum content is redesigned according to different professional modules. Different professional modules are recorded as a series of micro video or micro audio. According to the results of the student concentration curve study, it is difficult for students to pay attention to a high concentration for a long time. Therefore, recording video should be about ten minutes, closely related to the knowledge points involved in the teaching profession, mainly inspiring and story-based. The enthusiasm of students to learn independently.

2.4.2 Undergraduate self-learning video to complete the basic test

Teachers can transmit recorded micro-video or audio and guide learning methods to students through flexible and diverse questions, such as QQ group, WeChat group, online course space or communication platform APP: such as "Learning". Through these methods, students can use video, learning methods and some related quizzes to watch video self-learning in their spare time, and test their results by completing test questions. Through this self-learning, self-testing and self-questioning methods, the teaching effect is improved invisibly.

2.4.3 Before the class, students should be grouped to answer student questions according to the different nature of the profession.

Different courses have different professional forms, some need case discussion, some need role-playing, some need scenario simulation, and some need school-enterprise cooperation practice platform. Therefore, the student grouping is also fixed. According to the actual needs and nature of the professional, students are grouped in five to ten minutes before the start of the class. After arranging the professional team and professional process, the teacher sums up the list of questions asked by the students according to the class, and clarifies the specific questions. In addition, teachers can also understand the weakness of students' knowledge understanding based on the self-test results of students, and focus on pre-class emphasis to help students lay a good theoretical foundation.

3. Comparison of the Current Situation of Flipping Classroom Research at Home and Abroad

2012^[10] Richard Pierce used video blogs to carry out flip classroom teaching and cultivate students' active learning ability. It was found that students not only improved their grades, but also had positive views on teaching methods. 2014^[8] Paul Bapler and others found that active learning in a mixed learning way can not only achieve better than traditional classroom learning and improve students' perception of the learning environment. 2014^[9] McLaughlin and others overturned the pharmacy course at the University of North Carolina School of Pharmacy. Summary: If educators want to strengthen learning, improve teaching effectiveness, and meet students' knowledge of 21st century health care. The need for this approach is worth considering.

In the aspect of flipping the domestic localization of the classroom, 2014^[3] Zhang Rui, Zhang Yulan: The live broadcast of the support of the flip teaching model research professor analyzes the origin, development, effects of the flipping classroom and the constraints and challenges faced in China's implementation. It discusses the essential characteristics of the flipping classroom and puts forward a clear direction for the development of China's flipping classroom. 2014^[4] Zhou Qian: A new exploration of flip teaching based on practice misunderstanding, emphasizing that "learning after learning, learning to teach" is a kind of teaching innovation. In the implementation process, simple interpretation and mechanical application, gradually move toward adhering to the process, The misunderstanding of the form of practice. 2017^[5] Xiao Anbao et al.: The use of the rain classroom in the flip teaching of ideological and political courses in colleges and universities, using the network and new media new technology to promote the advantages of combining the rain classroom and flipping the classroom, and constructing a flip classroom teaching model based on the rain classroom. The model has been applied in practice. 2016^[6] Fang Yigui: The requirements and construction strategies of the mixed flip teaching mode for foreign language teachers in higher vocational colleges, from the individual dimensions of teachers, teaching teams, schools, industry university-research alliances and other dimensions to propose a diversified construction strategy for foreign language teachers Establish a new concept of vocational education in mixed flip teaching, improve digital literacy, improve the effectiveness of curriculum design and classroom activities, and create a new teaching model with effective integration and complementary advantages of high quality "double teacher" teaching team. 2015^[7]

Zhang Zhizhou et al.: SPOC based aerospace electronic design classroom flipping teaching design, aiming at the problems existing in the current aerospace electronic design course teaching, clarifying the necessity of constructing the SPOC classroom of the course, and gradually building aerospace electronic design based on SPOC The MOOC course proposes specific measures to achieve classroom flipping and strives to improve the teaching quality of the aerospace electronic design curriculum.

3.1 Comparison of research type and effect evaluation dimension

In the research method, the experimental research method is used to analyze the effectiveness of the flipping classroom relative to the traditional classroom through the comparison of the pretest and the posttest. In the effect analysis, the student's academic performance is only one of the indicators, and more attention is paid to the perception of the student's own curriculum. Participation, satisfaction with teaching methods etc., while paying attention to students' ability to solve problems, information literacy, critical thinking, and collaborative learning.

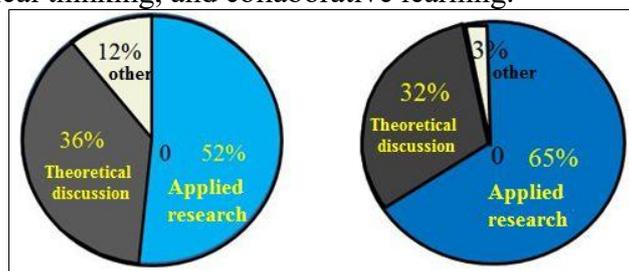


Fig 2. Theoretical Discussion and Applied Research Research Component Analysis Chart

In 100 domestic literatures (Fig.2), the domestic flip classroom research is still at the stage of localization of new things. The research hotspots are mainly combined with micro-classes and MOOCs to construct teaching models. There are many theoretical research components. The applied research literature mainly evaluates its effects through test papers, questionnaires and interviews. The evaluation dimensions mainly include academic achievement, attractiveness of the curriculum, recognition of teachers and students, students' interest in learning, participation, self-learning ability, and collaboration ability.

3.2 Comparison of applied disciplines

According to the cited and ranked domestic and foreign literatures, through the analysis of the top 100 document titles · keywords · abstracts, the data of the 100 foreign literatures involved in the applied disciplines were 67. There are 31 papers, accounting for 46.3%, and 25 science books (including 19 chemistry), accounting for 37.3%. Among the 100 domestic literatures analyzed, there are 45 literatures on applied disciplines, including 19 computer sciences, accounting for 42.2%, and 11 foreign language and literature (mainly English classes), accounting for 24.4%, and Marxist theory (Mainly in the ideological and political class, 4 articles, accounting for 8.9% and others accounting for 24.5%. Among them computer courses are more diverse, including computer application foundation · Flash animation production · web design and production. As far as the curriculum is concerned, the application of flipping classrooms is more of a public course or an elective course, which is related to the characteristics of the subject on the one hand and the information literacy of the teacher on the other hand. In the research and application of the flipping classroom, the teachers are mainly concentrated in the 30-40 age group. The teachers of this age group have better information technology and innovation consciousness than the old teachers. They are also more accepting new things, so they flip the classroom most. Try it in the classroom of these teachers first.

3.3 Overview of the development of foreign flipping classrooms

In 2007, two chemistry teachers at the Rocky Mountain Woodland Park in Colorado, USA, Jonathan Berman and Aaron Sams used the screen recording software to record Power Point presentations and teacher lecture videos to supplement the students who were absent. The video also shows the students who do not need to make up the class. Over time, they have formed the teaching method of “watching video before class, interactive internalization in class”, “flip” the traditional way of teaching in class, completing homework after class, American Woodland Park. High school has therefore become the birthplace of the flip classroom. In 2011, Jonathan Bergman and Aaron Sams summed up the experience of flip teaching for many years, and wrote a book on flipping classroom research. “Flip the classroom: Every student who arrives in every class every day” (Flip Your Classroom: Reach Every Student in Every Class Every Day). In this book, they introduce themselves to explore the implementation strategies of flipping classrooms in practical teaching. In 2012 Lindi Park High School held a campus open day, allowing more educators to personally flip the classroom and feel the impact of flipping classrooms on teacher-student relationships and student achievement. Under the successful demonstration and vigorous promotion of Woodland Park High School, the impact of flipping classrooms extended to the United States. In 2011, Lake Elmo Elementary School introduced the Moodle platform to the flipping classroom. After the students watched the course video, they did the test on the Moodle platform. The teacher then organized the classroom teaching according to the students' self-study. A year later, most of the teachers expressed their reluctance to use traditional methods of teaching, and the flipping classroom was well received by students and parents. In addition to Lake Elmo Elementary School, the first-line teachers of the American Highland Village Primary School, the Riverside Unified School District, and Clintell High School have also “flip” the classroom. In 2011, the flip-up class was rated as “a major technological change affecting classroom teaching” by the Globe and Mail. In the same year, Salman Khan publicly advocated “re-creation of education with video”, which triggered the attention of educators around the world about flipping classroom education models.

Later, the Khan Academy provided free instructional videos for the flipping classroom, and the MOOC also improved the participation of the flip-flop learners, and the impact of flipping the classroom gradually extended to the world.

3.4 Development history of domestic flipping classroom

In 2011 Chongqing Jukui Middle School took the lead in the implementation of flipping classrooms in China by breaking the geographical location and the conditions for running schools. Under the guidance of the “doing the best self” education concept, Jukui Middle School combined with its own situation to reform the flipping classroom model of the American Woodland Park High School and form a flipping classroom teaching mode of “four steps before class” and “five steps in class”. Four steps before the class (Figure 3): The first step, the teacher produces the tutorial; the second step, the teacher representative records the teaching video; the third step, the students watch the teaching video, do the test questions; the fourth step, the teacher develops individual counseling plan. Five steps in the classroom (Figure 4): the first step, the students do their homework independently; the second step, the group discusses the collaborative problem solving; the third step, the individual instruction of the teacher; the fourth step, the student completes the relevant exercises; the fifth step, the independent correction Wrong, consolidate reflection. The survey results of the Fukui Middle School flipping classroom model showed that 82.9% of the students liked or liked the flipping classroom mode. The curriculum reform of Jukui Middle School leads the country and has become a model for the practice of flipping classrooms in China.

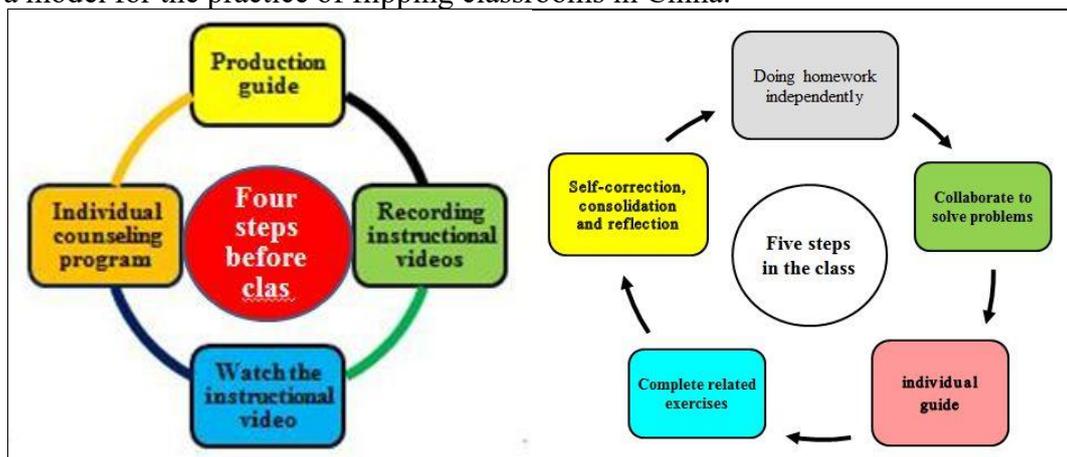


Fig 3. Four steps before class

Fig 4. Five steps in class

The precise search of China Knowledge Network (CNKI) with “Flip Classroom” as the “title” shows that the amount of domestic flip-flops has increased year by year (Figure 5). In the past five years, the academic achievements of China's flipping classrooms have been increasing rapidly. The expected volume of publications in 2019 is slower than that of the actual publications in 2017 ·2018, but the “cooling down” turning point does not seem to have appeared. In fact, it was from the beginning of 2015. In the early stage, 2016 is a truly strong period, with linear growth in the early years of 2017 ·2018 and 2019, and 2019 gradually slowing down. However, according to the technical maturity curve, the research on the flipping classroom teaching mode in China is still in the period of hot expansion, media hype reporting · resource openness · information technology popularization, and successful examples of domestic educational experiment pioneers push the flipping classroom to the researchers.

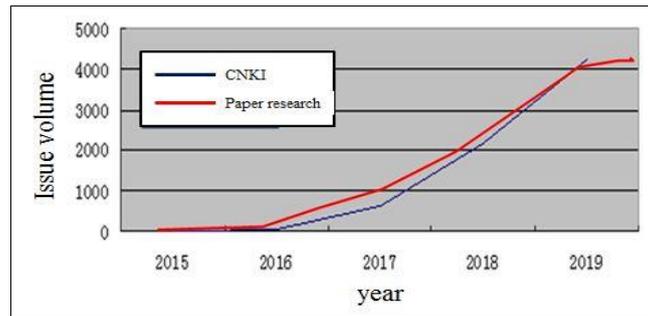


Figure 5: The trend of annual turnover of flipped classrooms

4. Flip the Innovation and Advantages of the Classroom

Through the first-line teaching practice, flip-flop classroom researchers at home and abroad confirmed the effectiveness of flipping classrooms. Strayer believed that flipping the classroom is an effective means to help learners' ability to collaborate, innovate and cohesive. The practice of Clintondale High School in the United States has confirmed that the flipping classroom teaching mode can significantly improve student achievement, enhance students' self-confidence, and reduce the occurrence of disciplinary incidents. Chen Mingxuan and Zhang Kangli believe that the flipping classroom mode enhances the learner's cognitive structure level, promotes multiple interactions between teachers and students, and significantly enhances the application of deep learning deepening learning strategies.

Flipping classroom teaching mode education is conducive to improving the overall learning ability and teaching philosophy. It is the practice of teaching activities that profoundly affects the formation of teaching models、the allocation of teaching resources、the standard of teaching evaluation, and the differences between traditional classrooms and flipping classrooms. The roots also began here.

Table 1 Comparison of the elements of traditional classroom and flip classroom

Comparison item	Traditional classroom	Flipping classroom
Background	Industrial Age	Information age
Teaching philosophy	Comenius University Education + Herbart General Education + Kailov Education	Mastering learning
Teaching mode	Learn first	Learn after learning
Role center	Teacher-centered	Student-centered
Education resources	Teacher + textbook	Teacher + textbook + online education resources
Teaching objectives	Preset type	Generating type
Teaching Evaluation	Summative evaluation	Formative evaluation

The theory of flipping classroom teaching is to adhere to 1986^[10] Bloom's "all students can learn well" master the learning theory. As long as sufficient time and proper teaching are given, all students can master the content of the course. The difference in students' learning ability can not determine whether they can learn, but only how much time it will take to reach the mastery. Master the theory of learning to guide the flipping classroom to all students rather than a few excellent students, respect individual differences, and not use cognitive ability as an excuse to let any student fall behind. From the perspective of educational concept innovation, the advantage of flipping the classroom is that it is conducive to the overall improvement of students' learning ability.

5. Flip Classroom Practice Examples

Engineering cost is one of the subjects of engineering management, and you can also use the flip classroom to learn. The teaching activities have already started before the class is turned over. After

the course, there is a teaching mode that is expanded and deepened. The teaching methods before , during and after class are our Internet technology and multimedia technology. The details are as follows in Figure 6 and Table 2:

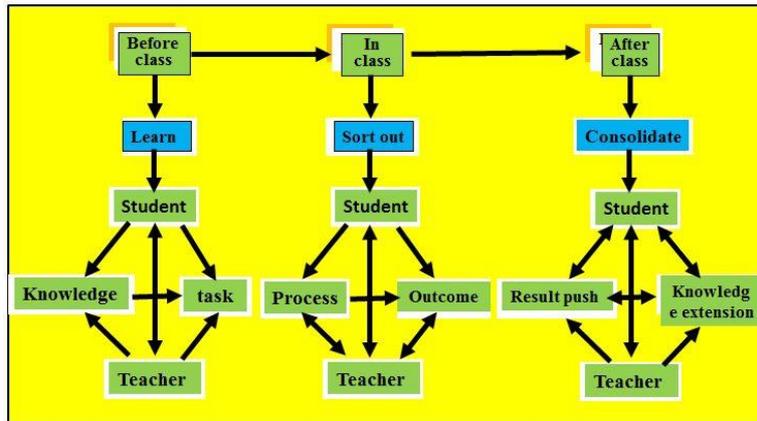


Fig 6 Flip classroom engineering cost professional Internet, multimedia technology learning map

Table 2 Flip classroom application analysis table

Ability training	Task content	Main point of knowledge
Application Ability	Preparation of tender notice	The basic terminology of project bidding, the basic process of project bidding, the method and content of bidding, and the technique of bidding
	Preparation of tender	
	Preparation of tenders	
	Logo project technical design book	Project overview, project target control measures, composition of the production process.
	Prepare project technical summary	Preparation of construction plan, preparation method and content of project technical design book, compilation method and content of project technical summary
Analytical ability	Case analysis of bidding	Bidding work flow, bidding preparation, validity of bidding documents, formation of bid evaluation committee, bidding information release
	Evaluation related cases	Bid evaluation plan, evaluation technical indicators, validity of bid documents
	Contract case analysis	Contract connotation、 characteristics、 main risks、 contract subject、 contract land、 contract rights、 obligations、 contract performance、 contract breach、 contract file management、 basic content of contract law
	Regulatory case analysis	Qualification management system, qualification business scope, qualification registration and supervision, occupational system, results management regulations

5. Conclusion

Research on flipping classrooms at home and abroad shows that countries with high fever in flipping classrooms are mainly in the United States, China, Australia, etc. This shows that the research on flipping classrooms is related to the degree of national education development and reform requirements. The student-centered and subject-oriented “flip classroom” teaching model is a huge reform of the traditional teaching method, which is in line with the way of cultivating talents today. Through the analysis of the status quo and characteristics of the practice examples of flipping classroom practice, it is proved that the flipping classroom can perfectly fit the teaching of various professional application skills courses, which can make up for the shortcomings of insufficient training of various professional teaching application abilities. It’s practical professional skills course

proposes a set of teaching frameworks that provide new solutions for professional teaching reform.

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