

# Application and Advantages of Reverse Classroom Teaching Mode Based on Learning Analysis in Chemistry Specialty Classroom Teaching

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**Abstract:** Under the background of big data, more and more information technology and network resources enter the teaching classroom, and by using learning analysis technology and its related analysis tools, teachers can obtain information about students' learning performance, learning process and learning environment. The teaching mode of flipping classroom enables students to carry out individualized learning. The construction of “Flipped Classroom” teaching mode based on learning analysis can promote students to optimize learning methods and help students to obtain more effective learning through practice.

## 1. Introduction

In 2007, chemistry teachers at Colorado Forest Park High School tried to record classes directly with screenshots and slides, and then posted them online, and they found that the classroom had changed a lot quickly. From the attempt of Colorado Forest Park High School in 2007 to the teaching reform experiment of Clinton Dell High School in 2010, and then to Khan College, the teaching model of “Flipped Classroom” has gradually developed from parts of Colorado to North America and even the world, and has been extended to almost all disciplines from individual disciplines. Since 2011, China has begun to explore the “Flipped Classroom”, which has formed their own characteristics in some middle schools.

This new teaching mode is defined as “Flipped Classroom” teaching mode because it flipped the traditional teaching mode. Under the traditional teaching mode, the teaching process is that the explanation of book knowledge is completed by the teacher in the classroom, and after class, the teacher will assign some homework or experiment tasks to be completed by the students in the classroom. The whole step is summed up as a process of “classroom information transfer - knowledge internalization after class”.

## 2. Overview of Study and Analysis

Learning and analysis is a kind of teaching technology that uses the advanced analysis method and the analysis tool to predict the learning result, diagnose the problems in the study, and optimize the learning effect. With the development of educational information and the popularization of on-line learning, the study and analysis have been applied to the teaching practice of higher education, and has achieved some results [1].

### 2.1 Definition of Study Analysis

Learning analysis technology is a mixture of big data technology and educational data mining, which has triggered the third wave of educational technology development in recent years. Although there is no unified definition of “learning analysis” at home and abroad, the above representative definitions contain the following common descriptions [2]: Learning analysis takes the behaviour data generated in the process of teaching and learning as the application object; learning analysis uses related technologies to predict the future situation and behaviour of learners; learning analysis aims to promote the occurrence of learners' learning behaviour; Learning analysis provides effective data support for personalized learning, so as to strengthen learners' acquisition of

learning knowledge and promote the achievement of learning objectives. Under the background of big data era, learning analysis technology and visualization technology make the collection, mining, processing and analysis of online behaviour data more scientific and show greater development potential. Common learning analysis tools include learning network analysis tools, learning content analysis tools, learning ability analysis tools and learning behaviour analysis tools [3].

## **2.2 Research Status of Learning Analysis**

Since the introduction of the concept of “learning analysis”, there has been a great deal of reaction in the education sector. The Horizon Project, a partnership between the New Media Alliance of the United States and the American Association for the informatization of Higher Education, both forecast in its annual reports for 2010 and 2011 that learning analytical techniques would become mainstream in the next four to five years.

The research on learning analysis in China mainly focuses on the definition of origin and concept, the introduction of relevant tools and the introduction of relevant case studies in foreign countries in the early stage, while in the later stage, the application of learning analysis technology and tools in different learning environments, such as distance education, MOOCs, e-book package, as well as its application in teaching to teaching evaluation, learning service mode, the impact of the requirements of teachers' professional skills [4].

## **3. The Change of the Classroom Teaching Mode**

Because of the subversion of the traditional teaching mode, the traditional “Classroom information transfer-the internalization of knowledge in the course of class” teaching process is turned over, so it also changes the teaching elements.

### **3.1 Role of Teachers**

The main function of the teacher is to guide and promote the effective study of the students. In this new teaching mode, the teacher's task is enlarged, both in the day-to-day teaching and before the class, to record a thin and effective teaching video, at the same time, the teacher is required to have certain information processing and processing technology, And it can design and organize the teaching content reasonably and effectively, so that the students are interested in the courseware, willing to use the time to study actively, and at the same time, the teachers in the class should have the pertinence and level to help the students to internalize and absorb the knowledge, which also requires the mastery of the spirit A variety of teaching methods to promote and stimulate students' interest in learning.

### **3.2 Role of Students**

Under the reverse classroom teaching mode, students can freely master the learning time, choose the learning place, the learning content, the progress and the number of times to watch the courseware. At the same time, in the process of learning, the middle school students can also communicate and discuss with other students and teachers through the information network, so as to complete the content of the study designated by the teacher and the scope of the courseware.

### **3.3 Allocation of Classroom Time**

The essential difference between “Flipped Classroom” teaching mode and traditional teaching mode is the change of classroom time distribution. From the traditional “classroom teaching” to “student-centered autonomous learning”. After class, the teacher will assign some homework to let the students achieve the goal of knowledge internalization through practice.

## **4. The Application and Advantages of “Flipped Classroom” Teaching Mode in Chemistry Teaching.**

In our country, the idea of “Flipped Classroom” teaching mode is the beginning of 2011, so how

to make this new teaching model really used for ourselves, this is a great challenge for us, and for chemistry such a very strong course, we need serious research and ongoing attempts.

#### **4.1 Optimizing Teaching Design**

The implementation of the “Flipped Classroom” teaching first requires the teachers to make clear the purpose of the course teaching and the knowledge points, design the guide and writing cases matching with the contents of the classroom teaching, record the related videos and PPT and so on, and design the self-test of the students' exercises. And distribute information on the network teaching platform for students to download and study. Through the collection, the relevant teaching resources in the network are transmitted to the students to facilitate the interactive communication and collaborative learning in the pre-class study of the students, and improve the self-learning quality of the students before the course of the class [5].

#### **4.2 Internalization of Class Knowledge**

“Flipped Classroom” will change the classroom teaching from the original teaching by teachers alone to the interactive learning between teachers and students. When teachers ask questions, they need students to solve them through discussion. In the classroom, the teacher guides the students to study and discuss in groups, so that the students form a atmosphere of mutual communication and cooperation. The teacher should give them with the emphasis on the personalized guidance. They should quickly master the students' learning progress and situation, clarify the problems encountered by the students and provide individual guidance. Therefore, the classroom time should not be taught more, and the teacher should personalize the students, guide them at different levels, and become the guide and facilitator of learning.

#### **4.3 Self-Inspection and Evaluation.**

At the end of each class, the teacher should guide the students to evaluate themselves so as to know whether they have reached the established goal. The teacher combs, sums up and summarizes the knowledge of the whole class, analyzes the learning results, and on this basis, guides the students to carry out the verification and application of practice. Under the guidance of teachers, students should improve their ability of autonomous learning and raise their thinking methods to a certain level.

### **5. Conclusion**

Under the “Flipped Classroom” teaching mode, teachers should have certain information awareness and information processing ability. At the same time, they should also pay attention to the school's network construction, improve the operation speed of the teaching network platform, and provide teachers and students with excellent open computer rooms and subject laboratories. Teachers should have enough time and energy to research and make courseware, question bank, learning guide plan and other materials. At the same time, they should reduce the amount of homework for students, so that students can have enough time to learn courseware repeatedly, communicate and interact with each other. Therefore, the “Flipped Classroom” based on learning analysis has a strong advantage in the application of chemical professional classroom teaching.

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