Research on the Application Strategy of Flipped Classroom in High School Mathematics Teaching

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Abstract: With the widespread use of the Internet in China, flipped classroom has become a new teaching mode, and has solved the defects of the traditional classroom to a certain extent. Although flipped classroom needs to rely on the Internet and is difficult to use in practice, personalized learning of students can be realized by making appropriate application strategies, while teaching quality and efficiency will also bring a qualitative leap. This paper analyzes and studies the application strategies of flipped classroom in high school mathematics teaching, expounds in detail the advantages and production process of flipped classroom, as well as students' learning feedback under the flipped classroom teaching mode, and further discusses its specific application in practical teaching.

Keywords: Flipped Classroom; High School Mathematics; Teaching Application Strategy; Teaching Model

1. The concept and advantages of flipped classroom

1.1 Concept of flipped classroom

Flipped classroom refers to a teaching model in which decisions about learning are shifted from teachers to students by realigning time inside and outside the classroom. China's traditional mathematics classroom is mainly based on the teacher's explanation, students just passively listen to the class. Flipped classroom in high school mathematics teaching is proposed strategically, enabling teachers to effectively use the teaching mode of flipped classroom to improve the quality of teaching [1].

1.2 Advantages of flipped classroom

1.2.1 To achieve personalized learning for students

High school mathematics flipped classroom enables students to control their learning rhythm and learn efficiently. Because each student's mathematical foundation and the ability to accept new knowledge are different. Therefore, it is necessary for students to learn individually.

1.2.2 Improve the efficiency of classroom teaching

Flipped classroom focuses on the interaction between teachers and students in class. This teaching method not only improves the communication between teachers and students, but also solves the problems of high school mathematics class students' low learning efficiency due to the high school mathematics content is too much and difficult.

1.2.3 Improve students' enthusiasm for learning

When the individuation of each student is concerned, the students are suitable for their own number learning method, stimulate students' interest in learning mathematics. After students solve a problem independently, they will be greatly encouraged and thus improve their enthusiasm for learning.

1.2.4 Cultivate students' ability of cooperative inquiry

Students bring problems to class and solve them through group discussion. If they cannot solve the problems, they can

seek help from teachers. In this process, students' ability to explore problems and communication and cooperation can be well cultivated.

2. Support system for flipped classroom technology

2.1 class

Micro-lesson is a new type of teaching resource inherited and developed on the basis of teaching resources such as teaching example, teaching courseware, teaching design and teaching reflection of traditional single resource type [2]. Flipped classroom in the form of micro-class has attracted wide attention in the field of education in China. As the carrier of flipped classroom content, micro-class can facilitate teaching by virtue of its short and concise characteristics and relying on Internet platforms and mobile terminals, so as to ensure the teaching progress.

2.2 Network interactive platform

Micro-class can explain a knowledge point clearly in a very short time, which is available for students to watch and learn at any time and anywhere. However, unlike traditional teaching, micro-class allows teachers to interact with students while explaining and get feedback from students on knowledge mastery in time to adjust the content and progress of the lecture[3]. While tencent classroom interactive platform can achieve this network and student exchanges, tencent is actually a class can listen online software, for to turn classroom teaching, teaching objects are students, teachers can not only by setting up the class to let the students to enter in the form of building their own class, and can through online named interact with students. Students can also respond to questions by raising their hands in comments and online.

Network interactive platform can make up the shortcomings of micro course can interaction, but it also has the insufficient place, such as: although this software live classroom can open at any time, can also play the teacher's explanation content, but the best requires teachers to the students have time, can use this software for teaching students. However, teachers or students will have poor network conditions, thus affecting the quality of classroom teaching and teaching efficiency.

2.3 Evaluation system and indicators

The object of this evaluation is flipped classroom. This paper evaluates the flipped classroom teaching strategy proposed in this paper by using the learning evaluation index system of middle school students written by Li Shuqin in The Construction of Flipped Classroom Teaching Evaluation Index System for IT Majors and combining with the characteristics of high school mathematics [4]. See Appendix II for the student learning evaluation scale.

3. Research and practice on the application strategy of flipped classroom in high school mathematics teaching

3.1 Extracurricular preparation strategies for flipped classroom

3.1.1 The extracurricular of classroom learning

In the flipped classroom teaching mode, teachers need to record micro-videos according to their learning situation. Teaching micro-video is the main material for students to study independently before class. Students can learn the basic and main knowledge points in the textbook by watching the video before class. Micro video should make students like to watch, understand and harvest.

Teachers make micro videos by themselves, which can be divided into three steps: knowledge module division, PPT courseware making and micro video recording. The first step is to divide knowledge modules. Taking the first chapter "Solving triangles" as an example, teachers can divide knowledge modules by referring to the teaching materials. It is mainly divided into two parts, the first part is about the law of sine and cosine, the second part is the application example. The second step is to make PPT courseware. Teachers need to collect materials to make courseware and prepare for recording micro videos. Materials are collected in accordance with the logical order of knowledge. For the solution of triangle, first deduce the theorem of sines and cosines, followed by the expansion of the theorem of sines and cosines, and put it into

practical examples to solve problems, practice, and finally contact practical application.

Step 3: Record teaching micro video. The teacher adopts the form of "screen recording software +PPT" to record teaching videos. According to the internal logic between knowledge points and the cognitive rules of students, PPT is played to present knowledge points step by step, accompanied by voice explanation.

3.1.2 Students complete knowledge transfer

First of all, teachers upload self-study task list. When the teacher is ready, it is best to upload it to the teaching platform three days before the new class begins. Students have plenty of time to preview the material, watch micro-videos and consult materials, and finish their assignments without forgetting them too quickly. Secondly, students study deeply on their own. Students' self-directed learning before class includes watching micro-videos according to the self-study task list to find problems and really understand their own learning situation. Finally, there is multi-channel feedback. Questions about learning need to be timely feedback to the teacher, so that the teacher master each student's learning situation, easy to class knowledge by step internalization and the generation of new knowledge points.

3.2 Teachers get feedback for adjustment

Teachers monitor students' learning progress through the network teaching platform, master students' learning situation through the feedback of the platform and students themselves, and design personalized tutoring programs to complete the teaching tasks in class.

3.2.1 Online supervision of students' learning progress

Teachers log in the network teaching system to supervise students' learning and understand their learning status, such as watching students' discussion process and problems in the completion of homework, communicating with students appropriately, and regularly making a reply to questions. Due to the difficulty of mathematics in senior high schools, teachers of mathematics can be organized to reply by division of labor.

3.2.2 Make specific counseling programs

In order to achieve efficient teaching, teachers need to make teaching plans for class hours, months and semesters according to the learning situation before class. Since students' learning situation is often inconsistent with teachers' previous self-mastery, the classroom teaching design should be modified and adjusted according to the changing learning situation, so as to make the classroom teaching design targeted, meet the needs of students, and truly help students to realize the internalization of knowledge [5].

3.3 In-class policy implementation of flipped classroom

3.3.1 Students show themselves

Students can show the effect of self-study, talk about learning gains and problems they encounter, and build their own knowledge framework for the content of the video. Each person's speech time is controlled at about 1 minute. The self-presentation of students before class mainly adopts the principle of voluntary students. During the demonstration, the teacher organized everyone to think carefully. After the demonstration, one student was randomly selected to evaluate the effect of the demonstration. After that, the teacher made a brief supplementary evaluation.

3.3.2 Teacher quizzes

In order to test whether the students have carefully watched the micro video, whether they have thought about it during the watching process and how much they think about it. Teachers can select one question from the video and put it forward again at the beginning of class, and select one student to answer it, which can not only check the real situation of students' self-study, but also supervise students to finish the micro-video study carefully before class. For slightly difficult questions, teachers organize students to have group discussions. Finally, the teacher announces the final answer.

3.3.3 Test questions in class

Students remember the material best at the beginning and end of the class. The test questions in this link can choose

knowledge-based test questions, which focus on the detection of students' mastery of knowledge and help students keep knowledge points in mind.

4. Summary and reflection

4.1 Summarize

Based on relevant literature and others' achievements, this paper applies flipped classroom teaching model to mathematics in senior high school. In turn the classroom teaching mode, through the implementation of the combination of extracurricular class, let the students self watch before classes, self-study task list and tag the heavy difficulty, classroom teachers organize students to display oneself, question test, group discussion to arouse the enthusiasm of students learning mathematics, such as the final test student learning outcomes through classroom practice.

4.2 Reflection

4.2.1 The production of micro class needs to be refined

Through the analysis of related questionnaires, it is found that a small number of students think the video production is not clear enough or the pictures are not representative enough. In the survey of the difficulty of micro-lessons, 20% of the students thought the video was easy, 61% thought it was moderate, and 19% thought it was difficult. Fifty-five percent of the students could understand the content of the micro lesson only after watching it once, while three percent needed to watch it three or four times. Then the unified production of micro lessons cannot take care of students at every level, so students with weak acceptance ability need to watch and learn repeatedly. Further refinement and refinement are needed in the production of micro lessons.

4.2.2 The organizational ability of teachers needs to be strengthened

In the process of experiment implementation, it is found that in class, because students have learned it before class, some students feel there is no need to listen to the class, and may chat with other students in class, so teachers need to have a strong ability to manage the class.

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