

The Studies on Application of Flipped Classroom in Middle School Teaching in China

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Abstract

To adapt to the development of information technology and train more modern talents for society, China's "Ten Years Development Plan for Educational Informatization (2011-2020)" proposes that education concept innovation should be the guide, and high-quality educational resources and information-based learning environments construction as the basis to explore more effective teaching models. As a result, the new "flipping classroom" teaching model has increasingly entered the education field, providing a new idea for the further development of the mathematical teaching model in middle schools. By using the literature analysis method, by collecting, identifying and collating the research on the application of flipped classroom in middle school teaching in the past 10 years, this study summarizes and summarizes the application value, characteristics, deficiencies, and strategies. It was found that for the application value of flipped classrooms in middle school teaching, current research believes that flipped classrooms can improve students' autonomous learning ability, give full play to the role of information technology, increase communication and interaction in learning, and improve teaching quality. As for the characteristics of the flipped classroom, current research suggests that the classroom flipped the teaching process, teaching organization form, teacher and student roles, teaching resources, and evaluation methods. Regarding the shortcomings of flipped classrooms, the current research believes that the main focus is on hardware facilities and video production. As for how to use the flipped classroom in middle school teaching, current research suggests that students should be the main body, the comprehensive level of teachers should be improved, and it should be implemented reasonably according to the hardware environment. However, current research is relatively one-sided and there are many gaps. Therefore, it is suggested that future research should be reasonably coordinated and comprehensive system research should be carried out.

Keywords

Flipped Classroom, Middle School Teaching, Model

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1. Introduction

The flipped classroom, also be known as and inverted classroom, subverted the previous classroom teaching model. With the support of modern information technology, it has reconstructed the learning process of students, so that the process of knowledge imparting can be completed after class, and the process of knowledge internalization can be completed through collaborative exploration and interaction between teachers and students in class. Flipped classroom is

composed of five elements: teachers, students, information technology, course content and multidimensional environment [1]. As a new teaching model, the flipped classroom has brought new opportunities to the reform of education. In recent years, a series of related studies have appeared in China. To better promote the research on the application of flipped classrooms in middle school teaching, this paper intends to review and sort out relevant researches in recent years, and summarize the results and methods.

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2. Sources of Method and Information

This article uses the literature analysis method. Literature search on CNKI with the topic "application of flipped classroom in middle school teaching" was conducted. From 2012 to 2020, 216 literatures were searched, and more were published in recent years. Through analysis, some experts conducted questionnaires on teachers and students to study students' adaptability to flipped classroom and teachers' experience of flipped classrooms and found that students still need to adapt for a while. Teachers believed that flipped classroom is worth promoting. Some experts combined information technology to study the effects of the flipped classroom in different environments, providing a reasonable basis for the improvement of the hardware environment. Most experts conducted field surveys, combined with the actual situation and data, to elaborate the application value of flipped classroom, and put forward suggestions such as taking students as the main body, improving teachers' level and improving the learning environment.

3. The Application Value of Flipped Classroom in Middle School Teaching

3.1. Improving Students' Autonomous Learning Ability

Improving students' autonomous learning ability is the biggest advantage of the flipped classroom [2]. Huang Guoqing and Gao Nan proposed that the flipped classroom teaching model leaves the initial stage of knowledge learning to the students themselves, and the students arrange the learning progress and control the learning time, which plays an important role in cultivating and improving learners' independent learning ability [1, 3]. Liu Guanghui, Liu Yongguo, and Wu Xiaoqing pointed out that with teaching videos, students can arrange and control their study according to their own situation. The students watched the teacher's video in a relaxed atmosphere and controlled the pace by themselves. The flipped classroom can ensure the timely solution of problems, guarantee a scientific and reasonable learning process, and improve students' independent learning ability [4, 5, 2].

3.2. Giving Full Play to the Role of Information Technology

According to Huang Guoqing and Ren Na, with the help of modern information technology, the flipped classroom teaching model can extend the learning of school knowledge to all places. Learning with a handheld mobile device anytime and anywhere plays an important role in changing students' learning styles [1,

6]. Li Jiaojiao mentioned that the use of multimedia courseware provides students with rich perceptual materials and creates a rich and varied learning situation, which is conducive to cultivating students' innovative spirit [7]. According to Wu Xiaoqing, flipped classroom can satisfy students' sense of novelty and curiosity, and multimedia is more attractive to them. Learning knowledge through information technology can stimulate their desire for learning [2].

3.3. Increasing Communication and Interaction During Learning

Wu Xiaoqing and Liu Guanghui pointed out that the understanding between teachers and students can be improved through the flipped classroom. At the same time, it also can urge to improve their professional level. In the process of knowledge internalization in class, communication and cooperation are conducted in groups to discuss and solve problems with each other. Teachers can participate in the discussion with students to solve problems and strengthen communication between teachers and students [2, 4]. Ding Yumei and Liu Yongguo mentioned that the status of teachers and students in flipped classroom has changed substantially. Students as the main body of classroom teaching and teachers as mentors have greatly improved the interactivity of student learning and have very positive significance for improving classroom teaching efficiency [8, 5].

3.4. Improving Teaching Quality

Huang Guoqing pointed out that in the process of internalization of classroom knowledge, the flipped classroom teaching model takes problems as the center to create a personalized learning environment and guides students to seek solutions through independent exploration and group cooperation. Abandoning the lecture-style teaching method in traditional teaching, students have more time for independent learning, which is easy to stimulate students' interest in learning [1]. Gao Nan mentioned that flipped classroom not only deepens students' understanding of new knowledge but also enables teachers to expand knowledge when time permits, thus it improving the efficiency of the whole class and the quality of teaching [3]. Ding Yumei believed that in the application of a flipped classroom, students can preview the teaching content before class. For difficult problems, it can be solved through group discussion and teacher guidance, which improved the quality of teaching [8].

4. Characteristics of Flipped Classroom Teaching Model

4.1. The Reconstruction of Teaching Process

Huang Guoqing, Wang Pei and Zhong Xiaoliu proposed that

the flipped classroom teaching model subverted the traditional teaching process of "classroom learning + after-class practice". Students complete the knowledge imparting by learning the courses independently after class. The activity of doing homework was transferred to the class, and the process of knowledge internalization was completed through discussions between students and teachers [1, 9, 10]. Liu Guanghui and Yue Xiaoyun also pointed out that the flipped classroom subverted the class collective teaching process. In the past, students learned knowledge in class and finished homework after class. But in the flipped classroom, students study independently after class. In class, teachers teach students following their aptitude or carry out activities to help students master and apply the new knowledge and skills learned before [4, 11].

4.2. The Reform of Teaching Organization Form

Liu Guanghui pointed out that a flipped classroom skillfully combines online learning with face-to-face teaching through the hybrid learning model [4]. Huang Guoqing and Yue Xiaoyun mentioned that in the flipped classroom teaching model, teachers can provide individualized teaching according to the needs of different students, tap students' potential and promote their individual development. And the students who encounter different problems were divided into many groups, which greatly enhanced the interaction between teachers and students in classroom activities. In the organizational form of individualized teaching, when students encounter difficulties in learning, they will receive one-to-one tutoring on time, which is difficult to achieve in previous teaching [1, 11].

4.3. The Changing Roles of Teachers and Students

Huang Guoqing, Fu Ting, Wang Pei, and Wu Dandan pointed out that the flipped classroom teaching model enables teachers to change from the past imparters of knowledge and classroom managers to the guides and facilitators of student learning and to become partners for interaction with students. At the same time, teachers teach students according to their aptitude, so that in the personalized learning environment, the "audience" who passively receives knowledge has become an active explorer in learning activities [1, 13, 9, 12].

Ren Na, Zhong Xiaoliu, Xue Chenyang, and Yue Xiaoyun et al. also believed that teachers have stepped out of the role of knowledge instill and become helpers and promoters of students' learning, promoting students' independent learning and collaborative learning. Students are active learners and inquirers rather than passive receivers in traditional classroom teaching. Students take an active part in learning. Under the guidance of their interests, they consciously finish the

self-study before class and then take an active part in the in-depth class discussion with questions to sublimate knowledge and become the master of flipped class learning [6, 10, 11, 14].

4.4. The Innovation of Teaching Resources and Teaching Environment

Huang Guoqing and Wang Pei mentioned that micro class is the most important component of flipped classroom teaching resources. When watching teaching videos, students can use the pause and playback functions of the video player, take notes and think in time, control the progress of learning independently and facilitate the consolidation and review for a while [1, 9].

Different from the main presentation methods of teaching resources in traditional classrooms, such as textbooks or courseware, Ren Na, Zhong Xiaoliu and Yue Xiaoyun pointed out that in flipped classroom, the carrier of knowledge becomes short and concise micro-teaching videos, and students will not generate cognitive load and boredom. In the process of learning, if there is something they do not understand, they can always ask teachers or classmates for help. These teaching videos can also be stored for students to review when needed [6, 10, 11].

4.5. The Diversification of Evaluation Methods

Wu Dandan believed that in traditional teaching, teachers shoulder the task of teaching, and it is difficult to find students' problems. Comparing with the traditional teaching model, which only focuses on academic performance, flipped classroom pays more attention to the actual performance of students and teaching. Huang Guoqing and Yue Xiaoyun pointed out that the evaluation method of the flipped classroom teaching model changed the previous single paper-and-pencil test, and strengthened the application of expressive evaluation methods such as questionnaire, interview, small papers, and students' learning portfolio records. By combining formative evaluation with summative evaluation, diversified evaluation methods are adopted to evaluate the performance of students and teachers in the flipped classroom teaching model [1, 11].

5. Defects in the Application of Flipped Classroom in Middle School Teaching

Huang Guoqing pointed out that the reason why flipped classroom can achieve real-time depends on the hardware facilities. However, not all schools have this condition, so timely feedback may not be achieved in the implementation.

At the same time, she pointed out that not all teachers are proficient in making micro-videos. Whether the teacher can properly and reasonably design the teaching content of the video, clearly and methodically design the whole classroom teaching, and whether the teacher can effectively control the emergency of the classroom teaching, all these will affect the teaching quality of the flipped classroom [1].

Jin Qian believed that producing high-quality video requires teachers to invest a lot of time and energy and extra money to train in addition to their normal teaching duties. Besides, some students are not familiar with the arrangement of this educational technology. Both of them will affect the efficacy of the flipped classroom [15].

Zhao Shan and Wu Xiaoqing believed that the main problems of students are: confused by the new teaching model; they did not purchase a computer, did not open the network; lack of self-control and self-learning ability. All these factors restrict the effect of flipped classroom reform. The problems of teachers mainly include low video production ability; not familiar with the new teaching model. The problems of flipped classroom environment mainly include: How to transmit the teaching video recorded by teachers; How to communicate with students online about problems they encounter in self-study; Where to download the material for the exercise; Whether the students can download the teaching video or not; After class, could students conduct exercises on similar topics to consolidate knowledge [16, 2].

According to Li Hong, students' self-control ability is insufficient to ensure whether they can watch teaching videos as required. Students' learning initiative is insufficient, and teachers are far from students, so it is difficult for teachers to grasp students' learning levels. After the implementation of flipped teaching, it is difficult to quantify and measure the working effect of teachers, which may easily lead to problems such as teachers' inactive working attitude [17].

6. The Application Strategy of Flipped Classroom in Middle School Teaching

6.1. Student-oriented

Wang Pei proposed that students download the teaching videos uploaded by teachers before class and watch the videos for learning. If they encounter problems in the process of learning, they can consult a lot of materials through the Internet or discuss it with teachers and classmates. In class, teachers encourage students to ask questions bravely and give appropriate guidance when necessary, to deepen students' understanding of knowledge and form their knowledge

structure [9].

Song Jia Yi proposed that students should actively explore, construct and participate in the whole process; increasing awareness of cooperation and communication; monitoring their learning [18]. Fu Ting also believed that students can set their own pace, time and speed of learning. In case of difficulties in understanding knowledge, they can watch the teaching videos provided by teachers in class repeatedly or use the Internet to further search for information, instead of passively waiting for teachers to tell the answer [13].

6.2. Improving the Comprehensive Level of Teachers

Gao Nan pointed out that at present, some teachers are not able to master the way of video production, and some teachers are still inexperienced in education. They can not skillfully control the implementation of the whole class. Therefore, according to the current situation of teachers' comprehensive level, schools should organize more training to improve teachers' comprehensive level [3]. Ren Na proposed that teachers should ensure each student has a clear learning task when preparing the lesson and should urge them to complete it on time. Teachers should be able to guide students in classroom activities, control the time of each stage of classroom activities, manage classroom discipline, and ensure students' efficient learning. Teachers should actively participate in students' learning activities, which will conducive to understanding the situation of group activities, discovering problems, helping group members to make the activities go smoothly, and enhancing the guidance to students [6].

Song Jia Yi believed that teachers should strengthen the reserve of professional ability and the cultivation of students' study habits. In class, they should guide and monitor students' classroom activities [18]. According to Fu Ting, teachers need to design targeted inquiry activities based on students' pre-class preparation and knowledge acquisition to improve the effectiveness of classroom interaction [13]. Zhang Lining believed that teachers should pay attention to the changes in teaching methods and teaching structures, master modern information technology and make rational use of it, conduct targeted learning through various trainings and advanced studies, and strive to improve the ability of micro-class design and classroom teaching organization, to meet the needs of flipped classroom teaching [19].

6.3. Implement Reasonably According to Hardware Environment

Zhang Lining proposed that in flipped classrooms, whether it is the production and release of micro-curriculum by teachers, or watching and studying micro-curriculum after class, and

instructing students to carry out personalized and collaborative learning, computer and network technology are inseparable [19]. Schools should guarantee the implementation of the flipped classroom from hardware to software. Carrying out comprehensive flipped classroom training for students, so that students can learn micro-courses with relevant information technology, and adapt to the new teaching model as soon as possible. Gao Nan pointed out that flipped classroom relies heavily on hardware. In the case that students cannot learn by video at home via the Internet, teachers can record CDS in advance for students to learn [3].

7. Discussion

In general, the application of flipped classrooms in middle school teaching in China is mainly studied in four aspects: application value, characteristics, shortcomings, and strategies. For the application value of flipped classroom in middle school teaching, previous studies believed that flipped classroom can improve students' autonomous learning ability, give full play to the role of information technology, increase communication and interaction in learning and improve teaching quality. As for the characteristics of flipped classrooms, previous researches believed that the classroom flipped the teaching process, teaching organization form, teachers and students' roles, teaching resources, and evaluation methods. For the shortcomings of flipped classrooms, previous studies believed that it mainly focused on hardware facilities and video production. As for how to apply flipped classrooms in middle school teaching, previous studies have suggested that students should be the main body, teachers' comprehensive level should be improved, and the implementation should be reasonable according to the hardware environment.

Although the above researches have been more in-depth, it can be seen from them that, on the whole, the current researches are relatively one-sided, and researchers cannot systematically integrate every research element, so there are many gaps. For example, there are few researches on how to improve the recognition degree of the flipped classroom, and few researches on the comprehensive ability improvement of middle school teachers. There are few studies on how to improve the flipped classroom environment for middle school students, etc. These are all directions for future research.

8. Conclusion

To adapt to the development of information technology and train more modern talents for society, the flipped classroom teaching model originated in the United States has deeply entered the field of education in China. Reviewing these

studies, we can see that they mainly focus on four aspects: application value, characteristics, shortcomings and application methods. For the applied value, most researches believed that it can promote students' active learning and improve teaching quality. For characteristics, experts agreed that it reverses the teaching process, the roles of teachers and students, teaching resources and evaluation methods. Given the deficiencies, previous studies have suggested that students should be the main body, the comprehensive level of teachers should be improved, and the implementation should be reasonable according to the hardware environment. However, there are also many gaps in current research. Therefore, it is suggested that in the future, experimental research should be strengthened in combination with information technology, and comprehensive research on various factors should be integrated to make the application of flipped classroom in middle school teaching more widely recognized.

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