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Application of Flipped Classroom Teaching Model in Stochastic Process Course

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Abstract

With the continuous exploration of many stochastic mathematics scholars, stochastic processes have made vigorous development in scientific theory and practical application in recent years. By comparing the advantages and disadvantages of the random process classroom under the traditional teaching mode and the flipped classroom teaching mode, this paper proves that this teaching mode based on the flipped classroom is indeed worthy of continuous promotion in the teaching of random process courses. Finally, it puts forward some countermeasures to solve some problems existing in the process of flipped classroom teaching.

Keywords

Stochastic Process; Traditional Teaching; Flipped Classroom.

1. Introduction

In the early 20th century, the theory of stochastic process officially appeared in people's vision, and gradually developed with the continuous evolution of the needs of physics, biology, management and so on. With the development of the technology, the flipped classroom teaching mode has gradually stepped into people's vision and gradually integrated into various courses teaching in universities. Under the impact of this new teaching mode, the disadvantages of the random process course under the traditional teaching mode are more and more obvious. Therefore, it is of practical significance to study the application of the flipped classroom teaching mode in the random process course.

2. The Development of Flipped Classroom Teaching Mode

In 2000, Maureenlage and others in the United States described in detail the model of "flipped teaching" when they taught "Introduction to economics" at the University of Miami, and their achievements. But at that time, the concept of "flipped teaching" was not mature. In the same year, J. Wesley formally proposed "flipped classroom" for the first time at the 11th International Conference on university teaching. In 2003, Conzalez put forward a detailed definition of the teaching mode of "flipped teaching". He believes that "flipped classroom" refers to putting the teaching process outside the classroom, so that students have more freedom and can learn in their own way. These scholars only understand the "flipped classroom" in their own way, and did not popularize and popularize this new teaching model. Until the establishment of Khan college in 2011, “flip teaching” did not really go out of the region, gradually spread to the whole North America, and was favored by many university educators. With the rapid popularization and development of the internet, the method of flipped classroom has gradually become popular in China, and the flipped classroom teaching mode has gradually entered the teaching

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of university courses. For the traditional teaching mode, the flipped classroom mode has undoubtedly brought an unprecedented impact.

3. Problems in the Course of Stochastic Process under Traditional Teaching

Although the stochastic process course has gradually attracted great attention in Colleges and universities across the country, due to the late establishment of the course, the University's research on the course is still in a stage of exploration and development, and due to the differences between college students in knowledge foundation and learning objectives, Therefore, there are still many problems in the course teaching of random process under the traditional teaching mode.

3.1. Autonomous Learning after Class

At present, most universities believe that the teaching of random process course is based on the probability theory and other mathematical knowledge acquired by students in high school. However, the students' autonomous learning after class is ignored. Some students do not understand the learning content after class, so they can not get an answer immediately. The university courses are arranged in a week, so these learning problems can only wait for one week, which seriously affects the enthusiasm of students.

3.2. Single Old Teaching Mode

At present, the teaching of random process course in China is basically still in the teaching of theoretical knowledge. The teaching means of teachers are single. They only give a general explanation of the contents of subject teaching materials. They can not choose flexible and diverse teaching methods according to different teaching contents. At the same time, teachers often ignore the dominant position of students in the teaching process. There is a lack of interaction between teachers and students in the teaching process, which can not drive students to think. There are few classroom activities that can really give full play to students' subjective initiative, resulting in students' low enthusiasm in the classroom.

3.3. Students' Enthusiasm

According to the survey, students' interest in learning stochastic processes is not entirely due to their love of courses. Some students are forced by the dual pressure of academic credits and final examination scores. Students lack the initiative to learn random courses, but passively accept the knowledge explained by the teacher in class. Students' acquisition of knowledge completely depends on the teaching method of the teacher. However, due to the lack of novelty and innovation in traditional teaching methods, students are easy to be tired, sleepy and boring about the mathematical theory in the stochastic process.

3.4. Shortage of Teachers

The teaching of stochastic process course needs a team of teachers with high knowledge literacy and more knowledge reserves. The teachers should not only have excellent basic knowledge of mathematical theory and be familiar with some classical theories of stochastic process, but also have an understanding of other professional fields such as electronics, biology, insurance and finance. They can integrate the theoretical knowledge with life practice. At the same time, they are able to have accumulated experience in teaching, research and scientific research.

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4. Advantages of Flipped Classroom Teaching Mode

The emergence of flipped classroom has completely broken the mode of teachers speaking on the podium and students listening on the seat under the traditional teaching. As a new exploration of distance education teaching based on the Internet program, it is based on the research of the basic theory of traditional cognitive education, taking students as the learning subject and teachers as the guide of students' learning, It emphasizes a new generation of teaching mode focusing on students' autonomous learning. That is, before class, students first learn the teaching video files made by the instructor online, and independently complete the corresponding knowledge test according to the learning content in the video. By this way, they can understand the new knowledge in advance and prepare for the communication between teachers and students in the classroom. Then, in the classroom, teachers and students interact, discuss and exchange, coordinate and cooperate, explore and share experience, so as to truly realize a new paradigm of classroom teaching activities and master new knowledge.

The stochastic process course itself is to learn the professional knowledge of mathematical theory. The flipped classroom teaching mode enables students to independently learn the mathematical theory and mathematical formula they need to learn before class, and have a preliminary understanding of these knowledge in advance. It will not be like the traditional teaching mode, which can not enter the learning state in a short time because they are exposed to these mathematical theories for the first time. This leads to a loss of interest in the course. Students complete the preliminary understanding of knowledge before class. They only need to record their problems in content understanding, wait until class, and communicate with the teacher to get answers. In this way, students' learning efficiency is higher and their memory of mathematical formulas is stronger, so as to stimulate students' mathematical thinking logic. At the same time, more frequent communication between teachers and students can build a harmonious relationship between teachers and students, so as to truly make teachers the confidants of students, rather than the "fierce beasts" they fear.

The emergence of flipped classroom not only brings new learning mode to students, but also a new teaching mode for teachers. Under the flipped classroom mode, teachers not only need to comprehensively sort out the teaching content of random process in advance, analyze the key and difficult points in the teaching materials of random process, and make the teaching content into small topics, which can be taught step by step from shallow to deep. At the same time, for some parts that are difficult to express in simple words, we can communicate and interact with students by recording teaching videos, so as to become the guide of students' autonomous learning. Therefore, for teachers, the emergence of flipped classroom makes teachers' lesson preparation more interesting, and the richness of forms gives teachers more room to play. It is no longer necessary to analyze every key and difficult point step by step, give students space to think, understand the origin and derivation of relevant theories, and make the teaching effect better and better.

5. Reflection on Flipped Classroom Teaching Mode

For the traditional teaching mode, the application of flipped classroom in random process course does have unique advantages. However, due to the late emergence of flipped classroom mode, the effect of its application in teaching practice needs to be constantly tested. Therefore, the teaching effect can be measured by the students' recognition of the flipped classroom model, and some problems that may exist in the implementation of the flipped classroom can be found out in time.

Stochastic process itself is not an independent subject about mathematics. It is related to physics, biology and finance, so the content involved in the textbook will be more or less related

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to other subjects. It is too difficult for students who come into contact for the first time to understand these. Therefore, teachers need to have a clear understanding of various disciplines and be able to answer students' questions in videos given to students before class or in class. However, some teachers are backward in thinking, unwilling to change the traditional teaching mode or unable to accept the flipped classroom teaching mode for the time being. They are not suitable for the video production and curriculum design before class. At the same time, they are limited to teaching materials. Teachers need to spend more time and energy to find appropriate learning materials and be fully prepared to answer students' questions in class, which is challenging for teachers. Therefore, in the selection of teaching teachers, we should hire more high-quality and knowledgeable young teachers, who have a stronger ability to accept new things and a better understanding of students' psychological ideas. At the same time, schools should also update and supplement teaching materials to give teaching teachers a worry free atmosphere so that teachers can focus more on the production of videos and the explanation of problem.

For students, how to make themselves actively and seriously study the teaching videos carefully made by teachers before class is a crucial problem. According to the survey, few students can take the initiative to learn teaching videos before class, and most of them take a form. Therefore, they are silent to the questions raised by the teacher in class. They don't know when they ask, and few students will communicate their lack of understanding of knowledge with the teacher in class. The enthusiasm of students is not high, and the teaching effect is not satisfactory. At the same time, students watch videos and preview for an average of two hours. After watching the video, students also need to collect data to understand the unclear knowledge points, and then complete the pre class test so that teachers can fully understand the preview. This makes students' pre class preview task heavier. Too large course tasks are more likely to make students feel bored, which will attack students' enthusiasm and initiative, and their attitude towards course videos is easy to become perfunctory. Therefore, we should guide students' learning enthusiasm and reward students who seriously complete the course tasks.

Although the emergence of flipped classroom mode does bring new opportunities to teaching, it is also a challenge to grasp this new teaching mode and break the framework of traditional teaching mode at one fell swoop.

6. Summary

In general, the full introduction of this flipped classroom teaching mode in the teaching of random process course is conducive to cultivating students' ability of independent learning, independent exploration and mathematical logic thinking, improving students' learning enthusiasm, and building a good relationship between teachers and students. It is not only a major breakthrough in the reform of teaching methods under the environment of the development of modern information technology, but also an unavoidable development trend. However, the flipped classroom teaching mode is both an opportunity and a challenge. We should grasp the opportunity, continue to practice in the curriculum, find the problems existing in the flipped classroom mode, strengthen the innovation of teaching methods and teaching means to solve the problems. The flipped classroom teaching mode can make the teachers' teaching and students' learning process more effective and pleasant.

References

[1] Zhu Jianfeng. Comparative study on flipped classroom and traditional subject teaching mode [J]. Journal of Beijing City University, 2015 (05): 76-80.

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[2] Geng Huijun. Research on the application of flipped classroom teaching mode -- Taking the course of "logistics system planning and design" as an example [J]. Logistics technology, 2017,40 (07): 145-148.

[3] Liu Renbin. Reflections and Exploration on the teaching of undergraduate application of stochastic process [J]. Science and technology wind, 2018 (07): 25-26.

[4] Luo Peng. Practice and application of introducing "flipped classroom" into military theory teaching in Colleges and universities [J]. Contemporary educational practice and teaching research, 2019 (15): 11-12.

[5] Li Xudong. On the teaching reform and practice of "random process" course [J]. Education and teaching forum, 2019 (24): 67-68.