

Research on the Application of “Autonomous-Cooperative-Inquiry” Teaching Mode in the Course of Probability Theory and Mathematical Statistics under the Background of Informationization

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ABSTRACT

Informatization brings opportunities for teaching reform, especially for the teaching reform of basic courses in colleges and universities. The sudden COVID-19 epidemic completely changed the original teaching mode. The development of online teaching and the use of online teaching platforms provide unlimited possibilities for further teaching reform. In order to highlight the student's dominant position and stimulate students' enthusiasm for learning, the teaching reform of probability theory and mathematical statistics course in this article is from case collection, curriculum resource integration, teaching platform selection and the formation of "independent-cooperative-inquiry" teaching methods, which lays the foundation for the next teaching practice.

Keywords: informatization, teaching mode, inquiry style, curriculum resources

1. INTRODUCTION

With the progress of the times, informatization has become a major trend of social development. The information technology with multimedia and network as the core has changed the original mode of education to a great extent. All kinds of courses are changing on the basis of information intervention[1-2]. Courses are designed to train talents needed by society. With the development of information technology, the requirements of society for talents are changing. In order to adapt to these changes, all kinds of courses have been reformed in the aspects of curriculum resources, teaching contents, teaching methods, teaching modes and evaluation methods[3-5].

As a basic course for college students, probability theory and mathematical statistics course focuses on cultivating students' logical reasoning ability. It is highly theoretical and abstract in concept, which makes it difficult for students to understand. As a result, students often lose interest in learning due to setbacks in the process of learning. In order to change this situation, many researchers try to improve students' learning enthusiasm by means of information technology. According to the new curriculum standard, effective probabilistic and statistical learning activities need to be completed through hands-on practice, independent exploration and cooperative communication. Under the background of information technology, the level and quality of teaching can be improved by realizing the autonomous, cooperative and inquiry-based learning through network resources[6-7].

From 2013 to now, a large number of MOOC platforms have been launched in China. For example, the "China university MOOC" has solved many problems for the demand of teaching. These MOOC platforms deliver online courses that expand students' knowledge. "Rain classroom" is represented by smart phones, which can integrate complex information technology into WeChat and PPT, so that classroom interaction can be completed through mobile phones and remain online. The combination of rain classroom and traditional teaching can improve students' interest in learning, enhance the interaction between teachers and students and help teachers to grasp students' learning situation in time, so it can improve the efficiency of teaching.

2. ORGANIZING AND FORMING A COMPLETE SET OF CASES

Probability theory and mathematical statistics is a course with strong application, and its value is more prominent in the era of big data. In order to cultivate students' comprehensive application ability in the teaching of this course and to establish the subsequent teaching mode, it is necessary to select and design a set of cases suitable for students according to the theoretical teaching content of the course. For example, various appropriate probability modes are introduced into the three formulas, and some common cases in reality are introduced into the design of various distributions. In the process of teaching, teachers should modify and adjust the cases according to the acceptance of students at any time, so that the cases can be

more and more perfect. At the same time, these cases are integrated into the original teaching content to form a curriculum design based on cases. In the process of design, teachers should design how to introduce the case into the classroom teaching and how to let students participate in the independent - cooperative learning with the help of the case. In the teaching process of probability theory and mathematical statistics, the combination of theory and practice should be paid attention to the greatest extent, and applied teaching should be strengthened. The selected cases should be classic, interesting and more closely combined with the course content.

3. INTEGRATING AND OPTIMIZING THE INFORMATION COURSE RESOURCES

Probability and mathematical statistics course mainly adopts the combination of blackboard writing and multimedia demonstration teaching mode at present. Because the time after class is limited in the actual teaching process and the students' mathematical foundation level is uneven, many students find that knowledge is difficult to understand. It is difficult to achieve the expected teaching effect in this kind of teaching mode. On the basis of the existing teaching mode, if the information means can be introduced into the classroom teaching, it will greatly increase the amount of knowledge to students and improve the efficiency of teaching.

3.1. Carefully making courseware based on the rain classroom

This course of probability theory and mathematical statistics is a teaching platform for students to learn by themselves. Therefore, before the teaching, the courseware based on the rain class should be made well. The aesthetics, rationality and difficulty of the courseware should be taken into consideration. Students' cognitive level is limited by their level of basic knowledge, so courseware should be as simple and easy to understand as possible. As far as possible, it is necessary to demonstrate the knowledge points concreteness through graphics and animations, so as to reduce the difficulty of students' understanding. The selection of knowledge must go through the rigorous argumentation of the course group in advance and be suitable for the students' acceptance. Courseware can be divided into three parts: pushing before class, teaching in class and reviewing after class. Courseware pushing before class mainly selects the knowledge points with less difficulty, the knowledge learned before and the cases prepared in advance as the content. This courseware is mainly to help students preview, so that students can smoothly enter the classroom teaching stage. In class, the teaching courseware should be closely related to the content pushed before class. The main content of this class

is selected, which focuses on conceptual knowledge and the derivation of more complex and difficult knowledge, as well as the solution of cases. Reviewing courseware is mainly about the key knowledge review and selection of some expansion of knowledge after class. By decomposing the knowledge, the pressure of class time can be alleviated to a great extent. At the same time, students can be pushed some expanded knowledge outside class, which can enrich students' extracurricular life and better cultivate their ability and quality.

3.2. Reasonably designing and recording the micro-video based on the rain classroom

On the basis of the preliminary courseware and course design, it is necessary to record some short videos in order to present the knowledge to students vividly. Before recording the video, teachers in the course group must study and discuss the content of the video and divide the work. Before recording the video, they must prepare the script and record the video according to the script. Whether students can accept these videos, and whether these videos play their due role in students' learning of this course, it is necessary to conduct timely research among students, supplement or revise the videos according to the survey results, and re-record them if necessary. In the video recording, teachers must pay attention to integrating some typical cases and ideological and political elements into it, so that the educational function of probability and statistics can be fully reflected in students' self-study and classroom teaching.

3.3. Forming appropriate job library and test question bank

Whether it is online teaching, offline teaching or blended teaching, the effect of teaching must be reflected by testing students. At the end of each class, students should be given appropriate assignments in a moderate amount and with appropriate difficulty at all levels. Each chapter also needs to carry out a certain number of tests, so it is necessary to complete the design of test question bank. Test questions can be divided into different difficulties. Knowledge of the test should be comprehensive. The variety of questions can be added to the appropriate expansion of the kind of questions in the test. To ensure that the students really achieve the learning effect of the test purposes.

4. CONSTRUCTING THE "AUTONOMY-COOPERATION-INQUIRY" TEACHING MODE BASED ON THE RAIN CLASSROOM

The course of probability theory and mathematical statistics has many concepts, abstract and difficult theories,

and wide practical application. However, the problem teachers are facing now is that there is too little class time, and it is difficult for students to better master all the contents of the course in the limited class time. As a result, students' learning efficiency is low and their interest in learning is lost. The introduction of MOOC platform can make up for this defect. For class is the main carrier of the ten minutes of video, each of the micro video in multimedia animation on the probability and statistical knowledge should not be obscure, so that teachers can focus the attention of students. Teachers also can explain the animation and improve the students' interest in learning "theory of probability and mathematical statistics" at the same time. As an effective supplement of classroom teaching, students can not only realize the use of fragmented time to study but also improve the students' ability of autonomous learning to a large extent. Through the efforts of the course team in the early stage, teachers have finished the sorting of case sets, the making of courseware based on the rain class, the recording of videos, the design of assignments and the establishment of test question banks. It has laid a solid foundation for the establishment of the teaching mode. Modern education focuses on cultivating students' innovation ability, self-learning ability and teamwork ability. Therefore, in the course of probability theory and mathematical statistics, the "three-in-a-class, in-in-class, after-class, autonomous, cooperation-inquiry-based teaching mode" can be used to build a platform for students to cultivate their ability.

4.1. To make necessary preparations

Students can learn new lessons by pushing cases courseware and videos to them before class. According to the characteristics of teaching content and push content, students can choose a variety of flexible teaching methods to monitor the whole process of self-study. For example, for tasks that are suitable for cooperative discussion, students can be voluntarily divided into groups to study pushing the learning content. In the process of learning, teachers can monitor the students' situation in real-time according to the background of the rain class, and supervise the students who are not active in learning. If necessary, some open questions can be set for students to give their ideas to solve the problems in the form of consulting materials and group discussion.

4.2. Testing the reserved knowledge before class and teaching the main knowledge points

For the knowledge pushed before class, it is necessary to take part of the time to detect it, and the detection methods can be flexible and varied. Under the support of the rain classroom, teachers should first sort out the knowledge points, analyze the learning situation, design the teaching content, encourage students to interact with teachers actively, and contribute to the systematization of the whole

knowledge. Secondly, according to the case-solving situation of each group, teachers systematically sort out the common problems. In the case-solving class, teachers should spend at least a quarter of the time to discuss and let students find their own mistakes. At the same time, teachers can guide students to learn the correct solution steps. Because students' thinking is relatively active, they can give a variety of solutions. Teachers should collect students' solutions, innovative ideas and methods in solving problems and share with everyone. At the same time, teachers can let the students report in the classroom. On the one hand, it can exercise the students' oral communication ability and logical thinking ability, on the other hand, it also diverts and improves the thinking of other students, thus it can further cultivate their comprehensive quality. At the same time, teachers should evaluate the overall situation of students' preparation in class and share good points. Teachers should educate students who fail to complete the learning tasks in time and have an unserious attitude towards learning, and help to find out the reasons to prevent students' bad attitude towards learning from spreading in the class. In the interaction between teachers and students, teachers should pay attention to guide students to conclude and summarize knowledge, understand the relationship between knowledge points, internalize the knowledge learned, and further expand and improve the learned content.

4.3. Testing the learning effect of students by pushing homework and exercises after class

Students should basically master the contents of this chapter after pre-class autonomy-cooperation-inquiry learning and in-class internalization. After class, teachers should assign certain exercises for students to consolidate what they have learned. As students have different basic levels and different understanding abilities, some students may find it too easy and feel that they have not had enough to eat, while some students with poor foundation may only be limited to the understanding of the basic content. Therefore, when choosing exercises after class, teachers should have different levels. They can try to divide them into two levels: compulsory questions and optional questions. For the required exercises, teachers should stipulate that all students should complete them within a certain time. For the existing problems, teachers can communicate with students timely through QQ, WeChat and other mobile information platforms. For the optional questions, teachers must pay attention to a level of improvement, first encourage students to look up their own data to find ways to solve the problem, so that students with good foundation can put forward higher requirements, then it can cultivate their ability to self-study and look up data.

5. CONCLUSION

The reform of classroom teaching is endless. The purpose of the reform is to cultivate the talents needed by society. Through the establishment of a new teaching mode and the use of flexible teaching methods, teachers can gradually cultivate the quality and the ability of students, so that students can adapt to future development.

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