

# Study on the Application of Hybrid Teaching Mode for Higher Mathematics During the Epidemic Period

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## Abstract:

Due to the impact of the COVID-19 epidemic, under the background of the delayed start of the spring semester in colleges and universities in 2020, students' online learning-based teaching method has rapidly promoted the mixed teaching mode. During the epidemic period, the author set up the course of Advanced Mathematics for science and engineering undergraduates, and carried out the practice of mixed teaching reform in the online teaching process, which proved that mixed teaching is a process of mutual unification between teaching and learning. Through blended teaching, students' interest in learning can be greatly enhanced, their innovative spirit and creativity can be stimulated, and a good foundation can be laid for the cultivation of high-quality innovative applied talents.

**Key words:** blended teaching, online learning, COVID-19, teaching mode

The traditional exam-oriented education has gone through several decades, and its drawbacks have become increasingly prominent with the changes of times, and the voice of reform has emerged one after another. The traditional examination-oriented education regards test scores as the only learning result, and it is difficult to cultivate high-quality engineering and technical talents with innovative spirit. In the national innovation today, the reform of traditional exam-oriented education has become a historical necessity. Especially in the case of severe COVID-19 epidemic, the blended teaching method based on online teaching rises at the

historic moment and is increasingly favored by people.

Compared with traditional classroom teaching, the mode of mixed teaching is oriented to improve students' knowledge ability and application ability. Under the support of information technology, the two learning methods of "traditional" and "online" are integrated. The essence of mixed teaching mode is not simply to superimpose "traditional teaching mode" and "online teaching mode", but to combine the advantages of the two teaching modes under the information technology to achieve the best learning effect.

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#### 1. Specific implementation of blended teaching method

In COVID-19 outbreak of the moment, the colleges and universities in the country to require in 2020 spring term "closed on teaching and closed is not suspended," in this context, we have to reform the teaching method, we carried out predominantly online teaching practice of hybrid teaching, specific measures are as follows: first, aimed at the key points in the teaching of each section, design a practical problem, uploaded to the teaching group, let everybody after class. By solving the questions, students can master the basic knowledge of each section. Through online teaching, the proposed problems are systematically elaborated in detail, focusing on how to sublimate the actual background of the research problems into mathematical problems, and how to establish mathematical theories and methods by introducing mathematical concepts, and in turn guide the solution of practical problems. During the teaching process, students can watch the videos repeatedly and then upload them to the teaching group to deepen their understanding.

The key to the reform of blended teaching method on line is to design and select all kinds of

"problems" related to higher mathematics and set various problem situations. In volume II of higher mathematics, multiple integrals, curve integrals and surface integrals are involved. The problem is proposed based on these aspects.

The first group of problems: the double integral problem: (1) the volume calculation problem of curved top cylinder, (2) the mass calculation problem of flat slice, (3) the surface area calculation problem, (4) the center of mass calculation problem, (5) the moment of inertia calculation problem

The second set of problems: the problem of curve integral: (1) the problem of mass calculation of curved members; (2) the problem of work done by variable forces along the curve

The third group of problems: surface integral problems: (1) surface component mass calculation problems (2) flow flow to the side of the surface calculation problems

We are in the design of the above questions, try to consider undergraduate students' knowledge structure, combined with the mathematical knowledge of the undergraduate study, for the push the aspects of theory, try to use them learn mathematics knowledge, which will help students in accept with difficulty, is to review the previous knowledge of the mathematical knowledge, and exercise their ability to use mathematical knowledge reasoning, improve their interest in the learning of this course.

2. the influence of blended teaching method on students

What are the effects of hybrid teaching methods? What changes have been brought to the students? Based on student feedback, questionnaire survey and students' test scores, the following points are summarized:

(1) It deepens students' understanding of what they have learned and improves their ability to analyze and solve practical problems

Hybrid teaching pays attention to the students' subjectivity, initiative and autonomy of the play, pay attention to guide students through the analysis of the problem, is derived, using the concept and theory to solve practical problem well, in the process of middle school students to learn all aspects of the information collection and information, and learn to the analysis of existing data for various, can inspire students' thinking continued to deepen, and trying to seek a variety of solution to a problem in the process of training and the formation of creative thinking.

(2) Hybrid teaching method is conducive to promoting students to learn.

Learning is the basic requirement for people's ability in an innovative society. In blended teaching, teachers make students look up information by themselves through conscious guidance, make analysis and judgment through individual or group cooperation, and actively seek for answers. In this way, after repeated accumulation, they can acquire independent learning methods and make learning become a reality.

(3) Improved the students' comprehensive quality

The mixed teaching method stimulates students' inner motivation. When students are attracted to or troubled by a research problem, they look for ways to solve it. It is this kind of whole-hearted devotion to study and scientific attitude of research and exploration that helps students finally grasp the way to solve problems.

Although the teaching reform of the curriculum has achieved some success, it has also encountered some new problems and difficulties. For example, when students solve problems by themselves after class, some of them do not actively participate in the process and do it perfunctorily. There is no effective way to restrain them.

The above is the teaching design and teaching experience of "Higher Mathematics" for undergraduates majoring in science and engineering in one semester. The mixed teaching method is applied to the undergraduate higher mathematics course, which has some successful experience and needs to be further improved, which needs to be further summarized.

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