

# Reflection on the Mixed Teaching Mode of University Mathematics in the Information Age

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**Abstract:** With the arrival of information age, it is very necessarily for college education to combine closely with the traditional teaching mode and the Internet. Online hybrid mode still needs teachers to guide the form of a teaching model based on face-to-face teaching and network teaching, and motivates students listening carefully in class, after class make full use of network teaching platform for self-discipline and autonomous learning. On the other hand, big data era encourage teachers in colleges and universities must improve their own professional knowledge and practical problems of the combination of using some software such as Matlab, Lingo and Python, insert the classroom teaching, break the originally single theory teaching, and ignore the actual problem to make use of software to motivate students abilities in modeling and numerical simulation.

**Keywords:** College Education; Hybrid Teaching Mode; Network Resources; Mathematics; Software; Mathematical Model

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The teaching of university courses in the current information age should keep pace with the pace of the new big data era. However, the outdated teaching contents, means and methods reflect the lagging of current educational thoughts and ideas in colleges and universities to a certain extent. Mathematics education in the traditional sense attaches great importance to the theory, rigor and logic in the teaching process, which is of course very important. However, over the years, the teaching concept of laying emphasis on theory and light on application has also shown some disadvantages: Students in colleges and universities are obviously lack of ability to use mathematical theories and methods to solve specific practical problems, and they can't really "apply what they learn", which is the "pain point" of all mathematical theory courses. Therefore, we should take training students' application ability as the guidance and change the shackles of traditional teaching idea. It is imperative to reform the teaching mode, make full use of network resources, diversify the teaching mode and enrich the teaching content and teaching methods.

## 1. The status quo of traditional teaching mode

Passivity of classroom teaching. Teachers give priority to teaching, students passively listen to lectures as the center and adopt the infusing mode. Classroom discussion and active questions and speeches are insufficient, lack of independent awareness of learning, lack of active participation.

The 45 minutes of classroom teaching lack the introduction of real life and practical problems, and it is difficult for students to timely apply theoretical knowledge to practice. Most of the cultivated students are "high in vision and low in skill", lack of initiative and initiative to solve problems, and suppress students' creativity.

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## 2. The teaching innovation caused by several “pain points”

Pain point 1: Is it useful to learn math courses?

Solution: Pay attention to the introduction of practical background theory and numerical simulation of practical problems close to life.

Most math teachers will probably be asked this question in class: Is this lesson useful, Sir? Be like university common lesson: “advanced mathematics” in differential equation, “linear algebra” in matrix and determinant, “probability theory and mathematical statistics” in eigenvalue and eigenvector and so on. In fact, this is also the vexation of many mathematics theory teachers. Mathematics learning is not only to learn mathematical knowledge, the practical application of its modeling can be more important in order to learn the mathematical thinking method contained in it, this is the essence of mathematics. Therefore, in order to prevent students from giving up halfway in exploring the essence of mathematics, it is a powerful way to answer students’ doubts by introducing examples close to life and solving them with the knowledge they have learned. For example: ① Differential equations can be used to predict to what extent the original deep forest is felling, which will lead to the extinction of owl populations. ② The continuous or discrete dynamic system in the field of physics and chemistry cannot be separated from the solution of eigenvalues and eigenvectors.

Pain point 2: Students’ learning enthusiasm and initiative are not enough

Solution:

(1) The teaching content is carried out according to the mode of introduction of knowledge background + concept development process + specific explanation of knowledge points + ideological and political elements;

(2) After class: online Q&A by teachers and online self-study by students to make up for the problem of too much teaching content and insufficient credit hours, and to expand the content and time of students’ learning by means of online and off-class stratified teaching;

(3) Combine with network teaching, enrich the classroom with a large number of network resources; Reverse class is used to improve students’ ability of independent exploration.

My teaching mode is as follows:

First of all, the teaching mode with the teacher in class is adopted to explain supplemented + students turn pattern, in small groups, each group as a knowledge point, each group choose a leader made PPT for interpretation, each group of teaching result = the teacher point of 50% + 50% of the average score in the other team’s score model to give a comprehensive scores in each group. This mode not only exercises students’ independent exploration ability, teamwork ability and self-speech ability, it can be said that three birds with one arrow! Enhance the students’ learning pressure, motivation and enthusiasm.

Due to the advent of COVID-19, university teaching can no longer return to the traditional teaching mode of one mouth and one piece of chalk. Besides the current teaching mode of blackboard writing and PPT, classroom teaching must move towards the mode of online and offline mixing to adapt to the future development.

First of all, in addition to the MOOC learning platform, with the help of Bilibili and MOOC in Chinese Universities, Learning Power and Khan Academy and other online state-level excellent courses and exercise tutoring courses, students can study anytime and anywhere as long as they carry their mobile phones. Students who do not absorb enough knowledge in class can review and consolidate it, and those who are capable can explore further. To achieve the purpose of teaching students according to their aptitude, at the same time to make up for the teacher’s limited teaching ability. For these platforms are well-known teaching team effort to build a course, as a teacher is difficult to make, in the platform has a variety of rich examples and exercises for students to choose and practice, there are many simple mathematical model, the interpretation of helping students to understand the learning content, stimulate students to learn this course and even all the interest in mathematics curriculum.

Finally, the comprehensive evaluation of students’ scores is as follows: Assessment method = normal homework 20% (in-class exercises + homework) +2 process exams 40%+ final exams 40%, the specific pattern is as follows:

(1) Through the MOOC platform of learning, class exercises are released in class, and answers are attached to each question. Students can make mistakes in time, discuss with their classmates the purpose of learning and practicing in time, deepen their understanding and mastery of knowledge points, and score at any time. Broke the previous teacher corrects given to finish homework, students have to wait 2 to 3 days or a week’s time to see his homework problems, at last by learning the knowledge of forgotten about our homework of traditional pattern, in-class practice and also can

supervise students do not pay attention to listening class, the purpose of desertion urge students to pay attention to the learning attitude. It also serves as a traditional mode for teachers to supervise students' classroom performance, classroom discussion and questions, so that teachers can spend more time on classroom teaching and answering questions, and improve teaching efficiency.

(2) After class, teachers release homework through learning, giving students the opportunity to practice knowledge points and exercises again. In addition, in class practice, one knowledge point and two exercises can make students better grasp the learned content. For students' homework and knowledge summary after class, the teacher can adopt the mode of "individual counseling, centralized answering questions", or according to the common problems found, through excellent homework sharing, video recording and live broadcast, centralized explanation. With the help of this form, students are encouraged to learn from each other and learn from the excellent ones. At the same time, teachers and students can grow together and improve the teaching effect.

(3) The two process of comprehensive grade exam score equal to 40% of accounts for a final exam scores than, breaking the previous such a final exam scores of pattern, can maximize mobilize the enthusiasm of students at ordinary times in peacetime and broke most of the students don't study hard at ordinary times, the final assault examination review how crazy bad habits!

After several semesters of teaching reform and innovation, the teaching results are as follows:

(1) Improve students' autonomous learning ability and participation in class, and transform students' passive learning into active learning;

(2) To activate the classroom atmosphere, the students from the bowed head group into the head group;

(3) The introduction of ideology and politics in the course improves students' sense of national honor and national mission;

(4) Through specific case analysis, students can intuitively understand the application of boring mathematical formulas in real life and stimulate their interest in learning.

### 3. Other reflections on online teaching

The advantages of online teaching are as follows: ① Online teaching eliminates the shortcoming that some students save face and do not like to answer questions. Without the presence of other students, they can actively participate in answering questions. ② For students who are active and good at self-disciplined learning, online teaching gives them a lot of space for thinking and can actively complete their homework. In addition, some self-learning students can search online platforms provided by teachers to obtain more resources for self-study or discuss learning with teachers. The disadvantage of online teaching is that for students with insufficient self-control, teachers cannot check the real learning status of students who live online. Even if teachers require some students to watch the replay of live video, these students will not really replay learning and cannot supervise it. However, under the traditional teaching mode, teachers can timely supervise and urge students to engage in learning, while under the network teaching, it is a test for students with poor self-control and poor self-consciousness. Therefore, I believe that the current effective teaching mode is the most appropriate mode, which is mainly offline teaching, online tutoring, Q&A and supplemented by online quality courses.

### References

1. Zhang R. Reform and exploration of mixed teaching mode in applied universities based on superstar learning. *Computer Products and Circulation* 2020; (04): 230.
2. Sun X. Exploration on the construction of computer information network teaching platform in colleges and universities. *Science and Education Guide (Top 10)* 2020; (02): 19-20.
3. Liu H, Wang C, Cai J. Exploration on the construction of online and offline Hybrid "Golden Course"—A case study of steel structure course in applied universities. *College Education* 2020; (07): 73-75.
4. Jian G, Zhao S, Li Y. Practice and exploration of public mathematics course teaching mode with local university characteristics. *Science Journal of Normal Universities* 2018; 38(11): 62-64.