

Theory and Practice of Research Teaching of “Partial Differential Equation”

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Abstract: the Teaching Methods and Strategies of “Pde” Course Mainly Include: Open Teaching, Discussion Teaching, Inquiry Teaching and Evaluation. in Order to Improve the Teaching Quality of Pde Course, This Paper First Analyzes the Challenges Faced by Pde Course in Engineering Colleges and Universities and Its Role in Pde Teaching, and Proposes to Integrate Pde into Teaching Equation Teaching is Applied to Teaching Innovation in Three Stages: Preparation Before Class, Guidance in Class and Summary after Class.

1. Introduction

The Course of Partial Differential Equation is an Important Professional Basic Course for Science and Engineering Colleges to Cultivate Students' Comprehensive Mathematical Literacy. However, with the Continuous Development of Information Technology, Various Digital Devices Have Brought Impact to the Traditional Partial Differential Equation Classroom Teaching, Forming a “Classroom Crisis”. It is an Important Way for Colleges and Universities to Carry out Curriculum Reform and Improve the Quality of Teaching, Which Has Important Theoretical and Practical Significance[1].

Through the Study of This Course, We Can Provide Necessary Materials for Improving the Overall Mathematical Quality of Students, and Lay a Foundation for Some Students to Further Study and Study the Theory of Partial Differential Equations. We Can Encourage Students to Continue to Explore the Content of Interest, Write Small Papers after Class, and Prepare for Further Study

2. Teaching Objectives, Methods and Strategies

The Teaching Objectives of This Course Are: to Solve Some Partial Differential Equation Problems Put Forward by Physics, Mechanics and Other Applied Disciplines; Open Teaching. It is Divided into Normal Class, Non Normal Class and Mathematical Physics Cross Training Experimental Class[2]. Different Objectives Are Implemented for Training: on the Other Hand, the Main Teaching of Natural Teaching Class is the Main Part, and the Students of Different Classes Are Interspersed with Each Other for Guidance, Question Answering and Exercise Class as the Auxiliary Stratified Teaching



Fig.1 Research Teaching and Research Path of “Partial Differential Equation”

Under the guidance of the teacher, students are required to complete two course papers, which are mainly used to train students' innovative thinking ability and comprehensive induction ability, and at the same time, cultivate students' interest in scientific research, so as to discover and approve potential students to encourage them to continue to engage in the subsequent study of partial differential equation.. based on the platform of university students' scientific research projects,

guide some students to participate in scientific research projects and cultivate them Their ability to solve practical problems by using their knowledge synthetically[3]As shown in Figure 1.

3. Allocation of Teaching Resources and Teaching Conditions

The website of partial differential equation course has been built. The online classroom, teaching resources and other modules have been preliminarily completed, and some teaching videos have been online for students to learn independently[4]. The syllabus of the course, the teaching plan of each teaching teacher every semester, the tutoring of each main teacher, the time and place of answering questions, etc. are published on the website of course teaching for students to learn

Equipped with a teaching assistant. Equipped with a graduate student of related majors for guidance. Practical teaching environment. The two laboratories cover an area of more than 500 square meters, with bright light and excellent environment. The laboratory is open to students for a long time, and computers, printers and copiers can meet the needs of teaching, students' graduation papers and scientific research activities

Network teaching environment. The College of mathematics and statistics has five multimedia classrooms, three computer rooms, and nearly 30 computers in its reference room. The website of the College of mathematics and statistics is connected with the campus network and the Internet, forming a smooth network pattern. The reference room has CD-ROM Database of American Mathematical abstracts, Chinese Journal Network and various excellent course websites[5], which can be viewed online The website of teaching resources of the source website mainly includes: National Excellent Course partial differential equation website: HT: /: pkc.cdu.cn/x/09/offc; National Excellent Course mathematical physics equation website: <http://ww.jingpinke.com>; Anhui excellent course partial differential equation website: HT: / wwbb.ustc.edu.cn/jpkc/xiaoji/pwffc

4. Challenges in the Classroom Teaching of Partial Differential Equations

The course of partial differential equation is generally offered in the second and third stages of the University. Due to the needs of comprehensive reform of the major, the class hours of the course are greatly reduced. This requires teachers to teach a large number of knowledge points to students in a short period of time. In addition, the course content is more difficult, and students' acceptance is low. With the development of information technology, mobile intelligent terminal has become the “No.1 enemy” of PDE classroom teaching. In class[6], “bow head clan” always pay attention to mobile phones, browse all kinds of information and turn a deaf ear to teachers' teaching; after class, they rely on the Internet to finish all their homework quickly without thinking. Teachers have to face up to this situation, break through the traditional teaching mode of partial differential equation course, adapt to the rapid development of information technology, bring mobile intelligent terminal into the course teaching, fully mobilize the enthusiasm of students' learning, let students effectively use fragmented time to learn, and improve learning efficiency.

The role of teaching in partial differential equations is the product of “Internet + education”. It is a teaching mode based on constructivism, post modern curriculum view and humanistic learning theory. It has essentially changed the traditional “Teacher centered” classroom teaching mode into “student-centered” teaching mode, deconstructed the teaching process in the traditional teaching mode, reconstructed a new interactive system based on information technology, and realized the organic integration of teachers, students, resources and platforms. The application of PDE can make the classroom teaching of PDE fully through the in-depth excavation of its connotation, optimization of curriculum teaching mode, and development of new curriculum teaching mode of PDE based on design.

5. Application in the Teaching of Partial Differential Equation

This course aims to cultivate students' ability to think and solve problems independently. However, the traditional cramming teaching is “Teacher centered”, with a single teaching method, a

variety of teaching contents and a lack of motivation for students to learn. Teachers will integrate into the course teaching, follow the concept of “student-centered”, focus on introducing heuristic and inquiry teaching methods into the teaching behavior chain, cultivate students' curiosity and curiosity, and create more opportunities for students to solve problems by hands as much as possible[7].

The network teaching platform is set up for teachers' construction before class. At the beginning of the new semester, students will be specially arranged to train on the use of PDE network learning platform and guide them to use the teaching platform correctly. According to the teaching requirements of the course, the students are divided into several groups for online learning, and the teachers guide them in time to consciously cultivate their independent learning ability.

The course of guiding partial differential equation in class is very theoretical, and the concepts and methods in the course all have deep engineering background. Single classroom teaching can not achieve the ideal teaching effect, while short and concise micro video is a good supplement. By elaborately making micro video, we use animation technology to change boring concepts and methods from static to dynamic. The teacher plays the micro video in the classroom for a short time, and the students can keep their attention for a long time, so as to achieve a good teaching effect[8].

For secondary knowledge points, teachers can arrange students to use fragmented time for self-study by watching videos, online exercises and tests, which can save part of classroom time. Teachers can aim at the common problems in network learning, design debate questions, carry out class debate, deepen students' understanding of knowledge points in the debate[9], and improve students' comprehensive quality.

After class summary, students use the network teaching platform to study the existing problems. We can look for solutions to difficult problems by watching micro videos repeatedly; we can discuss and solve problems online with tutors through teaching platform; we can also publish problems on teaching platform to drive other students to discuss together[10]. Students use fragmented time to complete online exercises, tests, and check for gaps. In order to build a unique thinking mode of students, cultivate their ability to find, analyze and solve problems.

6. Conclusion

In order to investigate the effect of teaching based on PDE, the author conducted a questionnaire survey. 87.34% of the students are “very satisfied” with the new teaching mode, 54.01% of the students are “very satisfied” with their learning situation, and the students show a high recognition of the new teaching mode, but 46.25% of the students are “not satisfied” with the teaching design, which shows that the teaching mode of PDE based course needs to be further improved and improved, so as to improve the PDE The teaching quality of equation course creates a new situation of developing classroom teaching activities centered on students.

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