

Teaching Mode of Mathematics in Applied Undergraduate Colleges and Universities Based on the "Emerging Engineering Education"

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Abstract. With the increasing demand for social talents, China strongly advocates the cultivation of applied talents, and supports the innovation and reform of the teaching mode in applied undergraduate colleges and universities based on the perspective of "Emerging Engineering Education". Based on several years' teaching practice, this paper analyzes some problems existing in the process of mathematics teaching in applied undergraduate colleges and universities based on the perspective of "Emerging Engineering Education", and puts forward some effective and reasonable measures to reform the teaching mode. It aims to improve the teaching quality of mathematics in applied undergraduate colleges and universities, and to cultivate innovative talents in applied undergraduate colleges and universities based on the perspective of "Emerging Engineering Education".

Introduction

"Emerging Engineering Education" refers to the promotion and innovation of a series of specialties aimed at new and scientific forms of industry, such as robots and artificial intelligence, which is driven by a new round of technological revolution. It also includes the transformation and innovation of traditional specialties [1]. The concept of "Emerging Engineering Education" has promoted the improvement of the training quality of applied talents, and also pointed out a new direction for the transformation of the docking industry in colleges and universities. Therefore, the cultivation of talents is guaranteed by the practical system. In order to meet the needs of talents in the era of "Emerging Engineering Education", the advanced mathematics education in applied undergraduate colleges and universities is faced with severe pressure of reform, and it is necessary to establish the rational teaching system according to the advanced mathematics [2-3].

Research on the Present Situation and Existing Problems of Mathematics Teaching in Applied Undergraduate Colleges and Universities

Applied undergraduate colleges and universities are a new orientation in order to meet the needs of economic and social development in the new period and the popularization of higher education. They take undergraduate education as the main body, applied talents cultivation as the priority, and the services for economic and social development of the region as the purpose of teaching. From our investigation and research, it is found that there is still a great gap between ideal and reality in the cultivation of students in the current applied undergraduate colleges and universities, and the teaching of advanced mathematics also shows some disadvantages as the following eight points: Firstly, the teaching contents are outmoded. Although the teaching content is comprehensive in theory, there are still some problems, such as too much emphasis on theory rather than practice. Secondly, the teaching method and teaching mode are relatively monotonous [4]. Teachers only focus on teaching and students passively accept it. As a result, students lack the ability to innovate. Thirdly, there is a lack of new teaching materials suitable for the major, and most of the textbooks currently used are the revised versions of the previous elite education textbooks, which is unsuitable for the teaching materials required by the applied undergraduate colleges and universities. Fourthly,

with the rapid development of popular education, the mathematics level of applied undergraduate students varies greatly, which puts forward a new test for advanced mathematics teachers. Fifthly, teachers' teaching concept changes slowly and the subjective initiative of teaching is insufficient. Sixth, the examination method of advanced mathematics examination is relatively single and the teaching evaluation system is not perfect. Seventh, most students think that advanced mathematics is boring and difficult to learn and has little interest in learning. Eighth, the teaching of advanced mathematics is separated from the teaching of follow-up courses. Based on the above situation, how to combine the teaching of advanced mathematics with the characteristics of specialized courses, combine the theory and practice of mathematics and how to stimulate students' interest in learning become the basic starting point of the reform of applied undergraduate advanced mathematics teaching [5].

Reform Measures of Mathematics Teaching Mode in Applied Undergraduate Colleges and Universities

The fundamental change of teaching concept in the teaching reform of advanced mathematics is needed in applied undergraduate colleges and universities. Firstly, it is necessary to change teaching ideas and teaching methods reasonably, and to be pragmatic and effective in the process of teaching. It is necessary to make clear the orientation of applied undergraduate colleges and universities. After all, there is a gap of the knowledge level mastering between students in applied undergraduate colleges and universities and that of academic universities [6]. It is anachronistic to carry on mathematics education to students according to the former elitist teaching mode, so we must take the basic concept and the basic principle as the emphasis in the teaching. Secondly, we should aim at training applied talents, and emphasize the application, so that students can basically master the ideological methods and skills of advanced mathematics. We should pay more attention to cultivating students' ability to apply the knowledge of advanced mathematics to solve professional problems, and in the concrete teaching process, reduce the threshold reasonably, reduce the unnecessary logical reasoning, and emphasize on the students' understanding of the basic concepts, so that students can preliminary grasp of the basic problem-solving skills [7]. Thirdly, the requirement of teaching needs to change from mastering the theoretical knowledge to cultivating the comprehensive ability. Fourthly, the aim of the teaching should change from book learning to theory practice. We should take the integration of theory and practice as a teaching purpose and put abstract theory into practice. Fifthly, students should realize the importance of learning advanced mathematics, and understand that advanced mathematics will be placed in the center of social and economic activities, not just the basis of other applied major courses in modern society with the rapid development of science and technology.

The Teaching reform of advanced mathematics in applied undergraduate colleges and universities should combine with mathematical literacy and improve learning interest. Teachers should understand the students' psychological characteristics and acceptance ability, take the first class of advanced mathematics well and cultivate students' interest in learning advanced mathematics. Many students think that mathematics is boring after experiencing intense and depressing study in senior high school, especially the massive exercise of mathematics. Therefore, from the point of view of mathematics history, students can understand the development of mathematics [8]. Combined with the anecdotes of Chinese and foreign mathematical figures, or the application of mathematics in the frontier of scientific and technological development, students can appreciate the beauty and charm of mathematics and will believe that mathematics is not so boring as imagined. Students can feel the powerful tool role of mathematics if they are addicted to mathematical modeling cases; At the same time, it should strengthen the connection of middle school mathematics content, let individual students go out of the shadow of middle school mathematics, adapt to the learning of higher mathematics as soon as possible and ensure the effectiveness of teaching.

The Teaching reform of advanced mathematics in applied undergraduate colleges and universities should promote the hierarchical teaching. With the expansion of enrollment in colleges and universities and the change of teaching materials in senior high schools, it is found that some students accept and master new knowledge quickly, but some students struggle to learn clearly. The adoption of a unified teaching model will inevitably cause excellent students to be dissatisfied and students with poor grades can not keep up with, as a result, they lose motivation to learn. Based on admitting the differences in students' physical and mental development, hierarchical teaching is to design the syllabus, formulate the teaching contents, and set up a new examination system respectively. It strives to let each student get better development in the harmonious atmosphere.

Firstly, according to the scores of college entrance examination and of the level test after admission, students can be divided into classes, more specifically, classes can be large classes and small class guidance mode. Students of science and engineering can also be taught in three levels, namely, A, B and C, while those who have both liberal arts and science students can be taught in different classes of arts and science. Secondly, hierarchical teaching test and appraisal should be carried on, and a perfect examination system should be established. It should cultivate applied talents with certain qualities, not advanced scientific and research talents with strong theoretical knowledge. Students should achieve the purpose of teaching according to the assessment contents. When giving courses assessment scores, on the one hand, the quality assessment points can be considered, including learning attitude, cooperation ability, hands-on ability and so on; On the other hand, ordinary assessment plus points can also be considered, including disciplinary attendance points, homework completion and ordinary unit test scores [9]. Through this assessment standard, students will pay more attention to the normal learning accumulation, which is helpful to change the situation of one-test decided, and at the same time improve the comprehensive quality of the students to a certain extent. Thirdly, advanced mathematics improvement courses should be added. As applied undergraduate colleges and universities, they should pay more attention to the diversification of talent cultivation as well as the cultivation of applied talents. For students with strong comprehensive ability and high theoretical level, they have the right to get the same education as that in other colleges and universities, so as to have the same advantages in further study.

The teaching reform of advanced mathematics in applied undergraduate colleges and universities should be properly combined with computer multimedia technology. Firstly, it should improve the multimedia teaching technology and carry on the reasonable CAI teaching. Although the multimedia technology has already been used in the classes, there are still many problems in the advanced mathematics education in the applied undergraduate colleges and universities [10]. Therefore, according to the specific situation of each major, a new teaching mode of "chalk, face-to-face teaching and microcomputer display" is adopted for advanced mathematics, and multimedia technology is used to assist teaching appropriately. Secondly, the mathematics experiment should be integrated into the teaching of advanced mathematics in applied undergraduate colleges and universities. Mathematics experiment is a kind of practical mathematics education activity which uses computer system as experimental tool and mathematics theory as experimental basis to assist higher mathematics teaching so that students can really learn to use it for teaching purposes. The study purpose of mathematics by non-mathematics majors in applied undergraduate colleges and universities is to solve the practical problems of the major by applying mathematics. As a new teaching mode, mathematics experiment adopts a different teaching mode. It is beneficial to cultivate students' practical ability to solve practical problems by using mathematical software. In addition, it can encourage students to think independently so as to improve the students' ability to find and solve problems [11]. However, according to the problems encountered in reality, teachers should pay attention to the following two points when they integrate mathematics experiments into higher mathematics: On the one hand, the appropriate teaching content of higher mathematics should be chosen to avoid increasing the students' learning burden. In the teaching process of advanced mathematics theory, the emphasis should be placed on the infiltration of

comprehensive analysis method, recursion method, analytic method as well as combination of numbers and shapes. Therefore, it can reduce unnecessary theoretical derivation and select suitable mathematical contents at the same time, which makes students feel easy to operate the mathematics experiment based on the basic theory concepts. On the other hand, the mathematics experiment should teach students to use mathematics software such as matlab, and pay attention to the basic theory and calculations at the same time. In the process of operation, teachers should emphasize on the teaching of students' ability of mathematical programming, and remind students that they should not rely too much on the calculation of mathematical software, but complement mutually with traditional advanced mathematics education.

Thirdly, it should establish advanced mathematics curriculum teaching platform through the computer network and the campus network. With the help of the network experience of the national and provincial fine courses, our teaching platform can include the areas of solving key and difficult curriculum teaching, the interactive discussion area between teachers and students, the synchronous training of courses and the problem solving area of unit exercises after class. It not only provides an extra-curricular teaching and training platform for students, but also opens up a new place for the communication between teachers and students.

Summary

This paper analyzes some problems existing in the process of mathematics teaching in applied undergraduate colleges and universities based on the perspective of "Emerging Engineering Education". The main problems are that the teaching contents are outdated, the teaching methods and teaching modes are relatively single, there is a lack of new teaching materials suitable for the major, the students' mathematical level varies greatly, the teacher's teaching idea changes slowly, the examination method of advanced mathematics examination is relatively single, most students are indifferent in learning, and the teaching of advanced mathematics is separated from the teaching of subsequent courses. According to the existing problems, this paper puts forward a variety of reform measures of teaching mode in order to improve the teaching quality of mathematics in applied undergraduate colleges and universities, and to cultivate talents in applied undergraduate colleges and universities based on the perspective of "Emerging Engineering Education".

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