

Mathematical Modeling Training Model in College Mathematics Courses of Exploring the Improvement of Students' General Knowledge

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Abstract. The university mathematics curriculum is a compulsory basic course for colleges and universities. As a basic course necessary for many sciences and technologies, it plays a particularly prominent role in improving the quality of personnel training. How to improve the quality of university mathematics learning and improve students' general ability is of great significance to improve the quality of university mathematics teaching and improve the quality of university personnel training. Firstly, it is stated that the university mathematics curriculum should change the teaching concept in the classroom teaching design and curriculum evaluation. Secondly, the specific implementation method of the "three-in-one" mathematical modeling training mechanism is constructed. Finally, based on this model, the problems in the actual teaching solved are summarized.

Keywords: quality of personnel training; general knowledge; mathematical modeling; problem orientation; student inquiry.

1. Introduction

The reform and development of Chinese universities has entered the stage of "taking the quality development as the core of the connotative development path". Improving the quality of talent training in colleges and universities is the function of talent training in colleges and universities, and the quality of college curriculum learning is the basis for improving the quality of personnel training. The essential. "University mathematics" refers to the general term for the mathematics foundation courses of non-mathematical majors in higher education institutions. The mathematics teaching content of modern universities is set to higher mathematics, probability theory and mathematical statistics, linear algebra, complex functions. As a necessary foundation for many sciences and technologies, university mathematics is an important indicator to measure the quality of personnel training in higher education institutions. As a compulsory basic course in colleges and universities, due to its strong logic and abstractness, university mathematics generally reflects the difficulty of learning, making the quality of learning in this course highly concerned by teachers and students. At the same time, the study of university mathematics courses Quality directly affects the learning of other professional courses and the future development and further study of students. Therefore, how to improve the quality of university mathematics learning and improve students' general ability is of great significance to improve the quality of university mathematics teaching and improve the quality of university personnel training.

2. Change of Teaching Concept

Firstly, the University Mathematics Program provides the necessary mathematical foundations for student follow-up courses. Secondly, the main carrier of the students' rational thinking in the university mathematics curriculum is to impart mathematical ideas and cultivate students' ability of mathematical literacy, logical reasoning, abstract thinking, mathematical thinking and applied mathematics. The mathematical modeling competition is an embodiment of comprehensively cultivating students' general abilities. After several years of practical exploration, the author should do the following in the design of university mathematics curriculum:

2.1 Teaching Philosophy Changed from “Teacher Center” to “Student-Oriented”

First of all, from the concept of solving the problem of "who is teaching for whom", although the answer must be "student", but in the traditional teacher-led teaching content, methods and evaluation criteria, student subjectivity is difficult to achieve and implement. In order to truly reflect the teaching-oriented approach, we adopted the "reverse thinking" when designing the curriculum, and changed the "teaching evaluation by teaching" to "teaching evaluation by teaching", that is, from "evaluating according to the teaching level of teachers" to "According to the student's learning effectiveness evaluation."

2.2 The Purpose of Teaching Changes from “Teaching Knowledge” to “Development Ability”

The focus of the curriculum is shifted from the level of knowledge acquisition to the level of knowledge acquisition and capacity development. The new teaching model pays more attention to students' self-learning and development ability, essay reading and retrieval and innovation ability, and internalizes knowledge into ability in the exploration of actual modeling problems.

2.3 The Content of Teaching Changes from “Knowledge System” to “Problem Orientation”

According to the students' cognitive rules, based on the organic combination of theoretical knowledge and actual cases, the "problem-oriented" is embedded in the curriculum content system, and the actual cases of professional courses are put into the basic mathematics classroom. The combination of theory and practice is reflected in Mathematical classrooms can be applied to build mathematical models to solve practical problems in specialized courses, and to promote students' internalization of thinking and general knowledge.

2.4 The Teaching Method has Changed from “Teacher Teaching” to “Student Inquiry”

The teaching method is mainly from teacher knowledge teaching to student inquiry learning. Teachers promote students' deep learning by means of guidance, inspiration and comment. The general basic teaching process is: the teacher (student) presupposition problem, the student group inquiry, the inductive summarization law, the teacher comment development, etc., to achieve the teaching goal of the students in summarizing and summarizing the basic laws, inspiring the innovation consciousness and enhancing the creative ability in the problem collaborative inquiry. .

2.5 The Curriculum Evaluation Changes from “Knowledge Level” to “Use Ability”

The method of course evaluation fundamentally determines the attitude, mode and effect of learning, and is the fundamental guarantee for the effective implementation of the corresponding teaching mode. The new mode evaluation method evaluates the level of knowledge mastery by using the ability to solve problems by knowledge, and focuses on the level of knowledge transfer into ability and creative use. In particular, the project paper writing is added in the usual assessment, which lays a good foundation for students to participate in the mathematical modeling competition.

3. Mathematical Modeling Training Mechanism

Based on the above theory and the platform of the mathematical modeling competition, the author makes the following attempts in the actual teaching activities:

3.1 Constructing a Mathematical Modeling Course System of "Basic Module + General Integration + Ability Training"

Basic modules: including Advanced Mathematics, Linear Algebra, Probability and Statistics, and Basic Knowledge of Mathematical Modeling. General integration: It means that the constructed curriculum system has strong cross-integration with each major. The establishment of the Mathematical Modeling Course focuses on the integration with the profession. It enables students to combine professional theory with mathematical methods, solve professional problems in accordance with the mathematical modeling process, learn in applications, and apply in learning. The course

focuses on case teaching, and the case comes from the research results and mathematical modeling competition topics of various professions in recent years. Capacity-building: Focus on capacity-building in the process of “student-centered” knowledge transfer. Mathematical modeling can develop students' ability to collect information, organize problem-solving skills, analyze problem-solving skills, teamwork, and write scientific papers. Therefore, through the mathematical modeling teaching, the educational concept of the branch was well implemented, and the goal of capacity building was completed.

3.2 Propose the Mathematical Modeling Series Competition Operation Mechanism

"Mathematical modeling into the classroom + mathematical modeling school competition + mathematical modeling national competition + mathematical modeling international competition", four forms gradually progressive. Mathematical modeling into the classroom refers to the form of self-learning. Students in the usual mathematics curriculum study, they form a team to complete the mathematical modeling in the form of mathematical modeling, as the usual results of this course. Mathematical modeling in-school, domestic and international competitions have a stable team of instructors, a perfect pre-match training mechanism, and a standardized competition guidance mechanism.

3.3 Adopting the Talent Training Mode of “Teacher + Academic Tutor”

Under normal circumstances, the contact between teachers and students is relatively small, mainly focusing on classroom teaching and after-school Q&A. However, students of mathematical modeling are different from regular teaching. Due to the challenge of mathematical modeling problems, the discussion and guidance of teachers and students participating in mathematical modeling are particularly frequent. The training model for students is a bold attempt and innovation.

On this basis, the following teaching problems are mainly solved:

(1) Solving the one-size-fits-all training model of all students in the curriculum system. The training of mathematical modeling adopts a new teaching mode of “open space, open time and open content”. Some students set up their own schedules, broke the administrative classes, and implemented classes. At the same time, in terms of students' learning ability, a group of students with high interest in mathematics and good learning ability are selected to expand them.

(2) Solving the lack of training of students' scientific research ability in the curriculum system. the mathematical modeling training mode can carry out the operation mode and management mechanism of the research activities after the competition, comprehensively improve the students' scientific research ability and employability, and improve the teachers' research level.

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