

The Construction of Higher Mathematics Course in Independent College-Based on the South China Business College of Guangdong University of Foreign Studies

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Abstract: In this paper, based on the talent training objectives of independent college and the current situation of students in South China Business School of Guangdong University of foreign studies, the basic ideas for the construction of higher mathematics curriculum in independent college are put forward. To build a higher mathematics curriculum system to meet the needs of application-oriented personnel training, to formulate higher mathematics teaching syllabus by classification, to compile application-oriented case teaching materials, to reform the teaching content and teaching methods of higher mathematics, to open elective courses of mathematical modeling, to cultivate students' innovation ability, to reform the test methods, and to optimize the evaluation system. The construction of higher mathematics curriculum is a systematic project, which needs a long time of exploration and research.

1. Introduction

As an innovative form of school running system, independent college's talent training goal is different from one or two colleges and higher vocational colleges. One and two colleges emphasize the cultivation of applied research talents with innovative ability, which is characterized by innovation and research; higher vocational colleges cultivate high-quality skilled talents, which is characterized by mastering certain skills; [1] independent colleges cultivate high-quality labor with strong practical application ability, social adaptability and certain innovation and entrepreneurship ability. [2] The orientation of independent colleges is to train applied talents.

Higher mathematics course is an important basic course for many majors of independent college undergraduates. It not only has the characteristics of high abstraction, preciseness and wide application, but also has the characteristics of many contents, great difficulty, wide foundation and strong skill. These characteristics determine that this course plays an irreplaceable role in the cultivation of students' quality. Therefore, it is necessary to do well in the construction of higher mathematics course Of great significance.

2. Measures

2.1. Define the Course Objectives of Higher Mathematics and Analyze the Mathematical Basis of Students

The transformation of the concept of higher mathematics curriculum in independent colleges lies in whether teachers can understand the curriculum objectives, reflect the orientation of application education, serve the application training program and strengthen the application ability training, build the higher mathematics curriculum system to meet the needs of application-oriented talents training, improve the quality of higher mathematics teaching, and lay a good mathematical foundation for the cultivation of application-oriented talents. This is the course goal of Higher

Mathematics in independent colleges. The core is to serve students and majors. Students in independent colleges have low scores in entrance, and their average level of mathematics is far lower than that of key universities. Students' mathematics learning ability, learning basis and learning consciousness are poor. Students' lack of learning motivation, lack of interest in mathematics and fear of difficulties are common. In addition, they have less time in class, fast progress and less classroom practice, which all contribute to higher education Mathematics learning difficulties. Compared with the students in key universities, they still have a big gap in the ability to acquire knowledge, and teachers' expectations for students cannot be too high.

2.2. Construct the Curriculum System of Higher Mathematics Based on the Principle of "Must be Sufficient" and "Development Needs"

A reasonable curriculum system must meet two principles: first, to ensure that students have a solid foundation of higher mathematics to meet the needs of students' professional learning; second, to ensure that some students need to further study in the major. We divide the required courses of Higher Mathematics in Nanguo Business School of Guangdong University of Foreign Studies and trade into three categories. The first category is science advanced mathematics for students majoring in computer science, which includes calculus, infinite series, ordinary differential equation, linear algebra and probability statistics, totaling 192 class hours. The second one is higher mathematics for economics and management students, which includes one variable function calculus, multi variable function calculus, linear algebra and probability theory. The third is higher mathematics for the innovation class of economic management (two innovation classes are set up in the school of economics and management of our university, with postgraduate entrance examination as the main goal). The content includes calculus, linear algebra, probability statistics. The teaching content is equivalent to the content required by the postgraduate entrance examination program with the number of three to four, totaling 224 class hours. In this course system, we have fully considered the development needs of all parts of students, implemented the principles of strengthening the foundation, focusing on application, enhancing quality and improving ability, and paid attention to both knowledge system and knowledge structure.

2.3. Make the Syllabus Matching the Curriculum System, and Reform the Teaching Content of Higher Mathematics.

After the curriculum system is determined, the syllabus and teaching content corresponding to the curriculum system should be determined. Before making the syllabus, we should fully study the needs of Higher Mathematics in each major, determine the teaching contents of higher mathematics courses in each major, and then form the corresponding syllabus. After that, the application-oriented case teaching resource database is compiled, and the mathematics cases with professional knowledge background are interspersed into the teaching materials of higher mathematics. Professor Xu Lizhi holds that the reform of curriculum and teaching materials should focus on: (I) interest, (II) intuition, (III) inspiration, (IV) skill, (V) logicity, (VI) simplicity, which is the greatest expectation. [3] We believe that this proposition has guiding significance for the current construction of higher mathematics curriculum and the reform of teaching materials. The selection only involves elementary mathematical knowledge, embodies the spirit of mathematical modeling, attracts students and may apply examples and mathematical modeling problems in the future, such as the establishment and application of functional models; such problems as the most economical material, the largest capacity, the least cost, the highest efficiency and the largest profit, etc., which are summed up as mathematical modeling optimization problems in higher mathematics; as The application of derivative of rate of change in geometry, physics and economics, and the mathematical modeling and application of projectile motion can be incorporated into the textbook of advanced mathematics for computer major. Using derivative knowledge to study marginal function and elastic function of economic function (cost function, income function, profit function, demand function, etc.) can be incorporated into calculus for students of economics and management. According to the different needs of different majors for mathematics knowledge and ability, choose teaching content, establish the relationship between mathematics and corresponding majors, let

students feel that learning higher mathematics is of great use in the future professional courses, understand the position and role of Higher Mathematics in the future professional learning, so as to improve students' initiative in learning higher mathematics. 2.4 Teaching at different levels and reforming teaching methods and means..

2.4. Teaching at Different Levels and Reforming Teaching Methods and Means.

Teaching methods and teaching means are the direct and concrete links to realize the teaching objectives, to implement the talent training mode and to improve the teaching quality. They are also the key to the reform of higher mathematics teaching. [4] The traditional mathematics teaching mode is that all students of the same major use the same mathematics textbook to teach the same mathematics course. In the face of students with different foundation, the implementation of the unified teaching mode will affect the teaching effect, and it is difficult to ensure the teaching quality. [5] We start from grade 18, and we use the teaching method of different levels since the students enter the school. According to the results of the college entrance examination mathematics of the freshmen of grade 18, we selected the students who scored more than 100 in the college entrance examination mathematics, and then set up two innovative classes in the two colleges of economics and management according to their own wishes and aspirations. The innovation class is mainly aimed at the students who have good mathematics foundation, are interested in mathematics and want to take the postgraduate entrance examination. For these students, in addition to completing the basic teaching tasks, at the same time, in combination with the goal of postgraduate mathematics, they should explain the corresponding theoretical knowledge and exercises, and the difficulty of homework should be increased accordingly, so as to further develop their logical thinking ability, the ability to analyze and solve problems, and improve their mathematical quality. So that they can master the ideas and methods of higher mathematics and reach a higher level in the study of higher mathematics. [6] In addition to the two innovative classes, the other is the ordinary class. In the teaching of the ordinary class, we take the application-oriented talents as the training goal, adjust the teaching requirements of Higher Mathematics in the teaching, take the basic concepts and principles as the focus of the teaching, strengthen the concept teaching, let the students master some basic questions, and reduce the requirements of some theorem reasoning and proving. In terms of teaching content, we should emphasize the purpose of application, take the necessity of sufficiency as the degree, pay attention to letting students master the thinking methods and skills of higher mathematics, pay attention to training students' ability to apply the knowledge of higher mathematics to solve professional problems, and the teaching goal should be changed from paying attention to the study of book knowledge to the combination of theory and practice. In the classroom, try to keep the interaction between teachers and students, carry out the classroom teaching in the way of dialogue, regard the classroom as a process of interaction and dialogue, replace "monologue" by "dialogue", try out this new teaching method, firmly attract the students' attention, let the students' thinking always follow the teachers, while listening to the class, students take notes, while thinking about the questions raised in the teacher's dialogue. Keep a high concentration of attention at all times, greatly improving the efficiency of classroom listening. Every time the teacher finishes an example, let the students practice a type of question as much as possible. This way of combination of speaking and practicing not only cultivates the students' thinking ability but also their basic computing ability. In order to improve their self-confidence and stimulate their enthusiasm in learning mathematics, they should try to keep some exercises that they can complete after class.

2.5. Set up Elective Courses of Mathematical Modeling and Mathematical Experiment to Cultivate Students' Innovation Ability.

Any mathematics education should pay attention to logical reasoning, but this is only one aspect of the problem. What's more important is to use mathematics to solve problems, solve problems in daily life, in other disciplines, and the questions given by the school are all answered. What we know and what we verify are very clear, and the questions must be made. But in the future, in the society, most of the problems we face are unknown in advance. The answer, even do not know

whether there will be an answer, this requires the cultivation of students' creative ability, learn to deal with a variety of practical mathematical problems. [7]

Set up mathematics experiment course and be familiar with the use of mathematics software MATLAB \ Mathematica, not only can make students use computer tools to do all kinds of basic operations and deal with some simple practical problems in the process of hands-on practice, let students truly realize the specific application of mathematics, share the joy of solving problems, improve their interest in learning, and train students to use mathematics software to realize the number Ability to learn goals. The course of mathematical modeling makes students know how to use the mathematical knowledge they have learned to solve problems in all aspects of real life, improve the overall quality of students and enhance their creative thinking, which is of great significance to the cultivation of students' comprehensive quality. [8] Therefore, it is necessary to introduce mathematical experiments and mathematical modeling into mathematics teaching. Through the application-oriented interactive classroom, flexible and diverse teaching methods, to cultivate students' ability of independent learning. Through group study, cooperate to complete some small tasks, and cultivate students' ability of unity and cooperation. [9] By encouraging students to actively participate in mathematical competitions and mathematical modeling competitions, and writing small papers, the ability of students to independently use literature, statistical analysis, logical demonstration, as well as the innovation ability of students is cultivated.

2.6. Reform the Assessment Method and Optimize the Evaluation System.

The reform of examination mode is one of the important tasks in the teaching reform of higher mathematics. Specifically, it includes three tasks: the reform of examination content, examination method and performance evaluation. [10] The main content of the examination is to examine the basic knowledge, basic concept and basic operation of the mathematics course, and to pay attention to the examination of various abilities, such as the ability of operation, reasoning and innovation. The examination method is not limited to one standard. It can be open-ended, closed-ended or paperless, that is, computer-based test. The scores of students are composed of three parts: the first part is the usual scores, including attendance, homework and classroom performance, accounting for 30%; the second part is unit test (written test), mid-term test (mainly for writing small papers), computer test (Mathematics Experiment), accounting for 30%; the third part is the final exam scores, accounting for 40%. These flexible and diverse examination organization forms make the assessment of students' performance not only limited to the written examination at the end of the term as the only assessment and evaluation method. This assessment includes not only the assessment of learning process, but also the assessment of learning results, and makes students pay attention to skill training and ability training on the basis of learning basic knowledge.

3. Conclusion

The construction of higher mathematics course in independent college is a systematic project, which can not be completed in a short time. There are still many problems to be explored and studied. We believe that the high-quality teachers are the main force for the success of the teaching reform. Teachers' educational thoughts and concepts, professional basis and cultural level, and educational and teaching ability are directly related to the curriculum construction and teaching reform of higher mathematics. In the future teaching practice, we will continue to strengthen the construction of teachers and explore new ways of higher mathematics curriculum construction and teaching reform. Only by keeping higher mathematics close to the actual situation of students and majors, can we improve the teaching quality of higher mathematics and better serve the majors.

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References

- [1] He Zhimin, Wang Jiajun, Zhang Xiangyun. Research on the construction of higher mathematics curriculum system and the reform of teaching content in Independent College [J]. University education, 2012, (9): 96-98(in Chinese)
- [2] Ye guocan. Cultivation of innovation ability of independent college students [J]. China higher education, 2004, (3):57-58. (in Chinese)f
- [3] Xu Lizhi. Views and suggestions on higher mathematics education and Teaching Reform [J]. Journal of mathematics education, 2000, 9 (2): 1-2(in Chinese)
- [4] Wang Aiyun, Zhang Yan. Research and practice of higher mathematics curriculum construction and Teaching Reform [J]. Journal of mathematics education, 2002, 11 (2): 84-87(in Chinese)
- [5] Li Huani. Teaching practice and research of higher mathematics courses in independent colleges at different levels [J]. Science and technology information,2009,(31):533-534. (in Chinese)
- [6] Yang Chaoli, Sha Minge, Fu XUEDE. Research on the teaching reform of applied undergraduate higher mathematics [J]. Journal of Kunming University, 2007 18 (4): 79-81(in Chinese)
- [7] Zhang Xia, Chen Xiu. Research and practice of higher mathematics teaching reform in Local Application-oriented Undergraduate Colleges and universities. 2009 (8): 29-30(in Chinese)
- [8] Chi Zi Meng, Wang Ying, Zhao Xin, Liu Chunyan. Research on the reform of higher mathematics teaching in Applied Undergraduate Colleges [J]. Modern business industry, 2012 (23): 164-165(in Chinese)
- [9] Ning Guiying. Reform and practice of higher mathematics teaching mode in Independent College [J]. China Science and education innovation guide, 2011 (9): 81-82(in Chinese)
- [10]Duan yuan, Hu Lanyi. Research and practice of Application-oriented Undergraduate Higher Mathematics Curriculum and Teaching Reform -- taking computer major of Guangdong University of science and technology as an example [J]. New curriculum research, 2017 (6): 14-16(in Chinese)