

Research on the Teaching Reform of Higher Mathematics for Economics and Management Majors

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Abstract : How to reform the teaching of higher mathematics has become a valuable problem for colleges and universities to deal with the challenge of big data era in talent training. In order to answer this question, this paper analyzes the current situation of higher mathematics teaching in economics and management universities. On this basis, this paper puts forward some suggestions on innovating teaching design, constructing diversified learning mode and assessment mode, and compiling teaching materials to meet the needs of big data era.

Keywords : Higher Mathematics; Economic and Management Majors; Teaching Reform

1. Introduction

Advanced mathematics is a public basic course for economic management majors, and it is an important basic course to cultivate students' abstract thinking and rigorous scientific attitude. Higher mathematics courses in economics and management universities include calculus, linear algebra, probability theory and mathematical statistics. As a basic subject, advanced mathematics provides mathematical calculation methods and learning tools for follow-up professional courses such as western economics, finance, statistics and econometrics. For example, econometrics is the necessary knowledge to study data analysis problems such as management and decision-making, financial risk and so on. To learn the statistical theory and hypothesis testing of econometrics well depends on students' mastery of advanced mathematics. In addition, many economists have mathematical background, which shows the importance of higher mathematics to economic and management science research.

For economics and management universities, it is necessary to cultivate talents who can skillfully grasp the theoretical basis of statistical description, mathematical modeling and prediction of business or scientific research data analysis, and solve practical application or theoretical problems combined with corresponding software applications. In order to help enterprises or scientific research institutions deeply tap the value of data and promote economic development, the most basic problem we must face is how to help students better grasp the core content of higher mathematics. It also urges college teachers to think about how to improve the teaching of higher mathematics.

2. The current situation of higher mathematics teaching for economics and management majors

2.1 Teachers' teaching mode is relatively traditional

For a long time, the main teaching method of higher mathematics is still the traditional mode of teachers speaking and students listening. At present, there have been different forms of presentation, such as SPOC, MOOC flipped classroom, combined with network resources. But for the general undergraduate colleges and universities, especially the general economic and management colleges and universities, the students' mathematical foundation is poor. Teachers teach according to the level of most students in

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class, and they don't pay enough attention to the students with weak mathematical foundation. Students prefer the form of blackboard and chalk teaching, but this way of teaching content can not be very much, because most colleges and universities require to reduce the number of teaching hours on the premise of ensuring the teaching task. Although the use of various multimedia courseware can really improve students' interest in higher mathematics, but this interest is only a shallow level of attention, lasting for a short time.

2.2 Students are passive and lack enthusiasm for learning

Due to the recruitment of liberal arts and science students for economic management majors, the content and difficulty of mathematics teaching of liberal arts and science in senior high school are not the same. In addition, the basic differences of students in different provinces lead to the serious polarization trend of students, and the differences in mathematics foundation and learning ability are uneven. The teaching content of Higher Mathematics for economic management majors is consistent, and the depth is unified. Some students feel that the teaching content is too much, the explanation is too fast and not deep enough. In the teaching evaluation, the final score accounts for a large proportion, neglecting the importance of the learning process, resulting in students' passive learning, coping with the exam, lack of enthusiasm to participate in classroom teaching, which is not conducive to stimulate students' initiative and creativity.

2.3 The update of teaching content is slow and the degree of specialty matching is low

The teaching content of higher mathematics is still classical calculus, discussing the related calculation and equation solving of continuous variables. With the advent of the era of big data, the modern economic field needs the analysis of large-scale economic data and the construction of multi factor model, as well as the approximate solution of the equation of calculus theory and calculation and numerical methods based on discrete data. Most of the higher mathematics textbooks focus on the rigor of mathematics and calculation skills, lack of application and innovative thinking of knowledge points, as well as modern mathematics knowledge and operation skills needed by economic management majors.

3. The direction of higher mathematics teaching reform for economics and management majors

3.1 Innovate teaching design and pay attention to the cultivation of applied and innovative talents

Economic cases can be integrated into the teaching of higher mathematics, and then the mathematical model can be established and solved by software simulation to achieve the purpose of economic application. Add case teaching, mathematical modeling, mathematical experiment and other modules, combine mathematical knowledge with economic application, carry out economic application research, stimulate students' interest in learning, cultivate students' application and innovation ability, and truly realize the idea of "mathematics as the foundation, economy as the use". For example, the introduction of cases such as "economic function, market equilibrium and break even, margin and elasticity, economic optimization, total economic function, sales forecast and cost analysis" can not only help students understand mathematical knowledge, but also connect with subsequent professional courses. On the basis of economic cases, through the construction of mathematical model, students can understand the thinking mode and process of mathematical modeling to deal with problems, and enhance the awareness and ability of learning for application. For economics and management majors, experimental teaching can be added, and mathematics related software such as Python, Matlab, Maple, Mathematica, SPSS, R can be selected for numerical calculation and data statistical analysis to solve complex manual calculation. Students can also use these advanced tools to understand and test mathematical ideas, so as to master the new way of mathematics learning.

3.2 Build a diversified learning mode and performance assessment mode

Based on the mathematics learning foundation of economics and management undergraduates, we can provide supporting videos, courseware, exercises and other detailed learning materials for the connection between middle school and university mathematics, so that all students can review before class teaching and get familiar with the knowledge connection between high school and university through the network. Combine mathematical concepts with economics, management, finance and other professional knowledge, build relevant cases, guide students to participate in group discussion, adapt to flipped classroom, learn to use rich network resources, join scientific research project group discussion, mathematical modeling group discussion, practical problem discussion, etc., so as to stimulate students' interest and motivation in learning and using mathematics.

3.3 Compile teaching materials to meet the needs of big data era and update teaching contents

Teaching materials are the core of teaching process. The preparation of advanced mathematics textbooks which mainly meet the needs of students in the era of big data for the ability of economic management is an important premise and fundamental guarantee

for updating the teaching contents of higher mathematics and improving the teaching quality of higher mathematics in the major of economics and management. Higher mathematics textbooks should weaken the proof of properties and theorems, pay attention to the understanding and application of mathematical concepts, reduce the difficulty of exercises after class through a large number of examples, a small number of symbols and a large number of graphics, and provide abundant practical examples. Add the experiment content, for the major of economics and management, we can choose the software related to mathematics, and match the corresponding software operation to the teaching contents of each chapter, so that the complex calculation in higher mathematics can be easily solved by software, which weakens the complicated calculation of higher mathematics, improves the students' practical ability and stimulates the interest of students' learning.

4. Conclusion

With the development of modern economics, the demand for mathematical knowledge is growing day by day. Good mathematical literacy is also one of the necessary conditions for economic researchers. Teachers should develop students' independent thinking and innovation ability by innovating teaching design, building a diversified learning mode and performance assessment mode and updating teaching content, so as to better achieve the goal of cultivating high-quality applied talents, innovative talents or excellent compound talents.

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