Research on the Path of Integrating Mathematics Software and Mathematics Modeling into Mathematics Teaching

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Keywords: Mathematical software, Mathematical modeling, Mathematical teaching, Practice, application path.

Abstract: In order to adapt to the development of school education, college mathematics has undergone great reform. But in the process of school education practice, there is still a big gap between the effect of mathematics teaching and the goal of actual education. This paper deeply analyses the practical value of integrating mathematical software and mathematical modeling into mathematics teaching course, combines mathematical software with university teaching content, and solves complex computational and functional mapping problems, so as to improve students' learning enthusiasm and self-confidence. At the same time, teachers should combine mathematical software with mathematical modeling in mathematics teaching, cultivate students' mathematical thinking quality and application ability of mathematical knowledge, and further optimize the content of mathematics teaching.

1. Research background

1.1 Literature review

This paper expounds that the idea of mathematical modeling is integrated into the teaching of Higher Mathematics in Colleges and universities. It is found that the idea of mathematical modeling plays an important role in students' learning and understanding of mathematical knowledge. By adopting this new model and teaching by teachers, colleges and universities gradually penetrate into students' daily life (Li et al, 2008). Mathematical modeling can greatly improve students' learning ability, and colleges and universities should integrate mathematical modeling into the backbone curriculum of mathematics teaching. In order to make up for the shortcomings of mathematics teaching methods. The school should also promote the understanding and application of mathematics software by mathematics teachers, and improve the positive influence of teaching ideas on students (Liu, 2003). The teaching curriculum in China is constantly changing. There are still many problems in the process of integrating mathematical modeling contest into teaching. Teachers should pay attention to the change of students' thinking mode and let students learn to combine mathematical modeling with practical problems (Dong, 2018). The mathematical methods used in Colleges and universities can no longer meet the needs of current economic development. It is necessary to gradually integrate mathematical software and mathematical experiments into the mathematics classroom. The use of mathematical software to solve some complex and difficult problems encountered by students in the curriculum can increase students' interest in learning (Zheng, 2003). In the process of teaching development, schools should constantly apply new mathematical software to teaching and gradually improve the teaching process (Fu, 2018). As an assistant tool of teaching, applied mathematics software in Chinese colleges and universities can better achieve teaching objectives and improve students' learning efficiency in the learning process (Zhou and Zhang, 2011).

1.2 Purpose of research

In traditional teaching, teachers pay more attention to the mastery of students' basic knowledge. This kind of teaching mode occupies the main position in teaching for a long time, resulting in students' learning attitude becoming negative and learning atmosphere is not strong enough. This

  DOI: 10.25236/icrtpe.2019.038

kind of teaching environment makes students lack innovative consciousness. Research-based teaching can improve students' interest in learning, and students' autonomous learning ability is also enhanced under this mode. The development of this teaching mode, the introduction of mathematical software and mathematical modeling, can enable students to get rid of the traditional teaching mode, in the process of learning more relaxed mentality. Through the study and application of mathematics software, students save a lot of time. At the same time, students' learning efficiency is constantly improving. The problems they encounter in the learning process are well solved. Moreover, with the rapid development of the education industry, students can continue to explore and solve problems in real life through modeling. This new teaching mode can cultivate students' mathematical application ability, and also enable students to have a deeper understanding of mathematical thinking in the process of learning theoretical knowledge. The study and application of mathematical software also enable students to better grasp and solve mathematical problems in the later professional course learning process. Therefore, based on the current situation of mathematics teaching, it is of great significance to explore the way of integrating mathematical software and mathematical modeling into mathematics teaching.

2. Analysis of the orientation principle of current mathematics teaching

China has carried out many educational reforms, emphasizing that in the process of teaching; schools should pay attention to the cultivation of students' quality. At the same time, it emphasizes that in the process of students' learning, schools should not only provide students with knowledge, but also cultivate students' innovative ability. Schools should actively carry out mathematical education activities and formulate scientific and practical teaching objectives in the activities. Student's learning goal can not only grasp superficial knowledge theory. Schools should formulate reasonable teaching models according to students' cognitive level and strengthen students' creative ability. Teachers should adopt effective methods to stimulate students' thirst for knowledge of mathematics. Good teaching methods can improve students' ability to find and solve problems. In order to achieve good teaching objectives and achieve goals, we need a dynamic teaching method. The traditional teaching level cannot meet the current teaching requirements. The research-based teaching form is very flexible, but it is not perfect enough, so we need to continue exploring and researching. This kind of teaching mode needs new teaching methods and ideas. If we want to determine whether a teaching method belongs to a new research-oriented model, the main judgment principle is whether the teaching method improves the students' enthusiasm and autonomy in the process of teaching. In the process of teaching, teachers should make rational use of new teaching methods and grasp the relationship between innovation, exploration and improvement of teaching effect in advance. Teachers should focus on guiding students to expand their mathematical knowledge, arousing students' interest in learning and improving their learning efficiency (Yan, 2010).

3. Practical value of integrating mathematical software and mathematical modeling into mathematics teaching course

3.1 Using mathematical software reasonably to solve complicated computing difficulties

Higher mathematics is an Abstract subject, which is more complex than other subjects. Students will encounter many difficulties and problems when they study, which brings troubles to many students. When students learn some basic theories and conceptual knowledge, they can generally solve some difficult problems through continuous efforts. However, as students learn more, their knowledge structure becomes more complex. At this time, students encounter many problems, mainly those related to calculation. It is difficult for students to solve them by their own efforts. Mathematics is a subject of high complexity, which will cause different degrees of obstacles in the process of students' learning. In this case, students may have some help if they use mathematical software to solve problems. The study and use of mathematical software can help students get

inspiration when solving high-number problems. It is conducive to improving students' learning enthusiasm, and it will also give students some confidence in solving problems. For example, in the complex calculation process, if the students want to calculate by themselves, it will be time-consuming and laborious. This will also have some negative effects on students' learning enthusiasm. After the students have mastered the basic concepts of mathematics and clarified the solution of mathematical problems, they can use software to calculate, such as limit calculation. Reasonable use of software can help students solve math problems better and faster, improve students' learning efficiency and increase students' learning enthusiasm.

3.2 Using mathematical software reasonably to solve the problem of higher mathematical function effectively

In the process of students' learning higher mathematics, the calculation of derivatives and limit is very complex and difficult. Using mathematical software, this problem can be solved very well. Function is also an important part of higher mathematics. Students will have some problems that need to be solved by software when solving function problems. When learning some functional knowledge, it will use graphs to express, in order to deepen students' understanding. In the course, it takes too much time for students to draw their own graphics and their learning efficiency will be reduced. Moreover, the pictures drawn by the students themselves are sloppy and not very accurate. This will make students have the idea that higher mathematics is too difficult to learn, which to a certain extent has hit the enthusiasm and self-confidence of students. In the long run, students naturally lose interest in learning higher mathematics and their attitude towards learning is not serious. Therefore, in the process of teachers' teaching, we should pay attention to guiding students to learn the application of mathematical software in the learning process, which can help students solve some complex and time-consuming mathematical problems. On this basis, when students solve the problem of drawing in function learning, they can use software reasonably to save time and improve efficiency. Students only need to enter relevant commands, and the software window can be drawn to the graphics they want. This will also save students' learning time in the classroom, and provide students with clear and accurate graphics, so that students can have a deeper understanding of the knowledge they have learned, deepen students' impression of the knowledge they have learned, and let students better internalize and absorb the knowledge.

3.3 Mathematical modeling improves students' practical application ability

Mathematical modeling requires students to start from practical problems, through the analysis and research of the problems, then establish relevant mathematical models and demonstrations, then continue to solve and test mathematical problems, and finally combine this model with real life, and apply it in real life. This process requires students to have rich imagination and detailed insight, but also requires students to have a certain degree of creativity. This can improve students' professional quality and their ability to apply mathematics. In the process of learning mathematics, students' ability to use mathematical knowledge is constantly strengthened, and in this process, students' ability to use mathematical methods to analyze and solve problems related to their majors is constantly improved. Professional teachers also believe that mathematical modeling really plays a very helpful role in cultivating students' mathematical application ability. Among the groups in the Mathematics Skills Competition, the most prominent students generally have strong innovative and practical abilities (Du, 2013).

3.4 Mathematical modeling moulds students' inquiry and creative thinking quality

Mathematical modeling and traditional teaching methods are quite different. In the process of modeling, students need to analyze and discuss a lot of problems, and try boldly. Students need to constantly guess and demonstrate problems, so it requires students to have a comprehensive and profound understanding of the actual problems, and to find the essence of the problem as soon as possible. If students want to find the internal relationship between problems and problems, they need to change their thinking habits and improve problems and solutions from different angles. This is conducive to the cultivation of students' creative thinking and inquiry thinking.

4. Effective application path of integrating mathematical software and mathematical modeling into mathematical teaching model

4.1 Establishing course system integrating mathematical software and mathematical modeling

In the process of mathematics teaching, schools should establish a teaching system with professional knowledge as the main line, and focus on the development of teaching mode integrating mathematical software and mathematical modeling. Combine the teaching contents of students' professional courses such as linear algebra, higher mathematics, probability theory with software and mathematical modeling, and carry out practical teaching. The application of this teaching method in students' learning can strengthen students' grasp and memory of basic knowledge. Students will also pay more attention to the application of mathematical knowledge in real life in the process of learning. In the teaching process, teachers should first guide students to use mathematical software flexibly, on this basis, and then cultivate students' mathematical modeling ability. In the teaching, we should introduce the contents of the expansion and application of professional knowledge as well as the contents of professional software learning. The main purpose is to let students master the principles and ideas of mathematics, and learn to use mathematical thinking to solve questions and questions, to promote the application of mathematical technology in real life.

4.2 Optimizing the teaching content of integrating mathematical software and mathematical modeling

When mathematical software and mathematical modeling are integrated into the actual teaching, teachers need to constantly optimize the teaching content and combine the typical examples in the teaching content with the new teaching mode. The teaching content can choose some representative schemes, such as traffic network planning, environmental pollution and so on. Teachers give these questions to students and let them discuss and Study on their own. Teachers can not directly lead students to research and study in this process, they should give students the initiative of the problem, and then give guidance and help according to the problems of students. Teachers should let students understand that learning mathematics knowledge is useful, let students know how to apply mathematics knowledge to practical production and life, so that students' practical application ability can be improved to a certain extent.

4.3 Enriching the knowledge structure system of mathematics teachers

In order to integrate mathematical software and mathematical modeling into the curriculum and achieve good results, it is necessary to enrich and optimize the knowledge structure of teachers. In view of this aspect, schools can establish incentive mechanism to increase the enthusiasm of mathematics teachers in learning and exploring this new teaching mode. Schools should train math teachers to master more knowledge of relevant majors, so as to become a more comprehensive student tutor with professional knowledge. Schools should also pay attention to guiding teachers to clarify the school's talent training objectives. In the process of teaching, teachers should let students deepen their understanding of mathematical expertise through mathematical modeling, and let students know how to apply mathematical knowledge in real life.

4.4 Create a strong learning atmosphere of mathematical software and mathematical modeling

The learning atmosphere among students is very important. In the process of mathematics teaching, teachers should not only emphasize that students pay attention to learning professional courses, but also let students have a strong interest in learning mathematical software. In the process of solving problems, they should apply mathematical modeling method, so that this new learning idea can really affect students. Schools can organize more experts and professors to hold lectures on mathematical modeling knowledge, and actively organize school students to participate in mathematical modeling contests. At the same time, in order to make students pay attention to the importance of modeling, the school can also put up some modeling advertisements on the campus

bulletin board. In addition, the school can regularly organize interested students to participate in the training of mathematical modeling. It can also offer optional courses of mathematical modeling. The school is the main body to promote the learning atmosphere of mathematical software and mathematical modeling.

Acknowledgements

1) Shanxi province education science “13th five-year plan” 2017 annual project “Research on the development path of teaching knowledge (MPCK) for normal mathematics students based on the implementation of core literacy” (SGH17H304)

2) 2017 teaching reform research project of Shanxi xueqian normal university “Based on guiding normal university students “hanppy teaching, understanding teaching, able teaching, good teaching” mathematical education curriculum and teaching optimization practice research” (17JG019Z)

3) 2018 university-level resource construction project for training elementary education teachers and campus leaders “Promote teacher professional development with evaluation” (2018ZY37)

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