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Research and Practice of Mathematical Modeling on Cultivating Students' Ability of Mathematical Quality

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Abstract: With the deepening of higher education reform, the cultivation of senior talents with innovative awareness and practical application ability has become the fundamental goal of higher education activities. In response to this, most colleges and universities have launched a series of teaching reform activities, and carefully explored the teaching mode that can achieve this talent training goal through the training of precision talents. In the teaching practice, the researcher found a positive role in the mathematical modeling teaching model in the cultivation of students' mathematical innovation ability and mathematical creativity ability. Therefore, it is of practical and theoretical significance to take mathematical modeling as the main subject to train students' mathematical abilities. The following starts with affirming the teaching effect of mathematical modeling, and analyzes the effective channels for the role of mathematical modeling in cultivating students' mathematical qualities. Second, based on the school 's mathematical teaching practice activities, it explores the mathematical modeling encountered in the process In the end, the optimal factors were finally put forward to solve the problem, so as to further implement the positive role of mathematical modeling, rather than talking on paper.

Keywords: Mathematical Modeling; Student Training; Mathematical Ability; Research

Mathematics is a basic comprehensive discipline, which is the basic knowledge system skills for deep scientific research and discipline application. In view of the low interest in mathematics learning in higher education and the weak core literacy ability of mathematics, the introduction and application of the "mathematical modeling" teaching model have effectively improved this talent training dilemma. The current mathematical modeling activities rely on their own advantages to accurately develop students' mathematical literacy skills, as follows.

1. Mathematical modeling to realize the cultivation of students' mathematical quality

1.1 Mathematical modeling activities cultivate students' information literacy

Information literacy is an important part of students' mathematical literacy ability. By constructing powerful information acquisition and learning ability, students can extract effective content from complicated digital information and increase their digital sensitivity. At present, students need to analyze the competition questions and read the relevant literature information through mathematical modeling activities, so as to quickly and accurately analyze the quantitative assessment of the final actual situation. For example, in the mathematical model competition for analyzing the escape route of criminal suspects, students need to use Internet

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data to collect and analyze various data such as the city's transportation network, and finally construct a mathematical model for the escape route of the criminal prediction. In the process of solving this model, students' information collection, information processing and innovation ability can be effectively improved.

1.2 Mathematical modeling activities enhance students' practical creativity

Mathematics is an abstract subject. For most students, mathematics learning has nothing to do with daily life. Therefore, students have a lack of initiative and enthusiasm in carrying out mathematics learning activities. However, through mathematical modeling activities, in this process, students can determine the main direction of mathematical model construction with various mathematical professional knowledge and skills. In order to build a clear mathematical thinking direction, the modeling can be used for the specific mathematical thinking about the problem unfolding. In this process, students' abilities to practice and apply mathematics knowledge and explore innovation will be improved.

1.3 Mathematical modeling activities realize students' team collaboration

As mentioned above, a modeling activity is carried out as a group, which not only involves mathematical expertise, but also computer operation capabilities. Under normal circumstances, a modeling competition team must have at least three people to complete the mathematical model construction and related paper writing within a given time. Therefore, in the current mathematical modeling activities, multiple students can start a harmonious exploration of the team for life problems and conduct mathematical thinking and inquiry applications. Students can cooperate efficiently and develop high-quality interactive exchanges in mathematical modeling competitions, and their mathematical qualities are naturally nurtured.

2. The deficiencies of mathematical modeling in cultivating students' mathematical quality

2.1 Universities do not have a clear understanding of mathematical modeling activities

In fact, mathematics modeling activities are not unique to mathematics students. Teaching activities in colleges and universities can be said that all professional disciplines related to university mathematics teaching can improve students'mathematics qualities through mathematics modeling activities. Students' creative ability to solve practical problems with the help of mathematical knowledge and mathematical tools. But at present, most colleges and universities do not pay enough attention to mathematical modeling activities. For example, some majors that offer college mathematics courses mainly focus on the teaching of textbooks. They have not been able to carry out extracurricular mathematics practice activities and have no chance to conduct mathematical modeling training.

2.2 The lack of instructors for mathematical modeling activities in colleges and universities

Mathematical modeling is closely related to mathematics teaching activities, but it involves practical problems. It requires students to have a correct way of thinking, so as to choose appropriate mathematical tools to establish the relationship between various variables and constants, and construct corresponding feasible mathematics. Structure, complete parameter calculation, mathematical analysis of the results obtained. In short, mathematical modeling activities need to be led by specialized instructors to provide students with certain guidances. However, at present, colleges and universities have not raised the level of mathematical modeling to the level of professional teaching. They are just some forms of extracurricular comprehensive practical activities. Therefore, students' mathematical modeling ability cannot be improved with high quality and precision.

2.3 The basic equipment of mathematical modeling in colleges is not complete

Mathematical modeling activities need to be carried out based on computers, and students need to be able to complete problem analysis and model construction in a concentrated three-day period. This also requires that colleges and universities can provide students with the necessary classrooms, computer equipment, etc., but in fact, because the school does not pay enough attention to mathematical modeling activities and insufficient investment in mathematical modeling teaching resources, the current development of college mathematical modeling lacks a foundation facility.

3. Mathematical modeling to optimize students' mathematical quality

First, mathematics modeling-related courses should be introduced in college teaching. For example, mathematics modeling

elective courses are set up to encourage students interested in mathematical modeling to actively participate in quality and ability learning. At the same time, in the evaluation of the elective courses, a new evaluation system is built, with the usual "performance + mathematical model" final evaluation and other evaluation models to ensure that students can complete the optimization of self-quality in mathematics through systematic classroom teaching activities Promote. The online curriculum resources of mathematical modeling should be opened up Nationwide to enhance the status of mathematical modeling activities in China's higher education, so that more and more students can participate in mathematical modeling activities and expand their ability of mathematical innovation. Second, in the current teaching management of colleges and universities, it is required to be able to pay attention to the positive role of talent training brought by mathematical modeling, so as to build a professional teaching team for mathematical modeling activities. Professional training should be carried out for college teachers and improve the mathematical modeling thinking of teachers. For example, mathematical modeling competitions can be held within teachers, and this skill can be seen as one of the important indicators of teacher evaluation, so as to fundamentally improve the professionalism of teachers. Third, in the teaching management of colleges and universities, special funds and special management institutions are provided for mathematical modeling activities. On the one hand, special classrooms can be set up in colleges and universities for mathematical modeling activities, equipped with professional computer facilities. On the other hand, the school can open an information-sharing website, so that students can collect the latest literature and actual cases of mathematical modeling through the campus network.

4. Conclusion

In summary, mathematical modeling optimizes and improves students' mathematical abilities through mathematical activities in rich forms and creative practical activities to ensure the comprehensive development of students. However, in the teaching practice, there is a lack of professional mathematical modeling teachers in college teaching and the mathematical modeling activities carried out are not innovative enough. There is also a lack of professional modeling laboratories so that students in the development of mathematical modeling activities computer hardware and software are unable to perform modeling design. For this, the college mathematics teaching activities must be able to transform mathematics teaching ideas, import mathematics modeling activities into ordinary teaching activities, provide the necessary software and hardware infrastructure for mathematics modeling activities, and rebuild mathematical modeling evaluation method to allows the mathematical modeling to better play its active role in cultivating students' mathematical abilities.

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