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The Exploration and Practice on Mathematical Modeling Teaching Team Construction

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ABSTRACT
In this paper, the current situation of mathematical modeling teaching team was expounded , the specific construction ideas of optimizing the team structure, strengthening the teaching reform, enhancing the scientific research ability and improving the guarantee measures were put forward, and the practical results of the construction of mathematical modeling teaching team in our college from the aspects of team teaching effect and scientific research results were introduced, which have important reference significance for the construction of modeling teaching team.
Keywords: *mathematical modelling, teaching team, mathematical modeling competition*

1. INTRODUCTION

Mathematical modeling is a process in which practical problems are approximately described with mathematical language and methods, and corresponding mathematical models are established and solved [1]. In Colleges and universities, modeling activity is an important way to cultivate students' awareness and ability of mathematical application, to enhance innovation and practice ability and to improve students' mathematical quality.In order to do a good job in modeling teaching activities and give full play to the positive role of modeling activities, the key is to build a modeling guidance teacher team with high professional level, rich teaching experience and brave dedication[2].

2. CURRENT SITUATION OF MATHEMATICAL MODELING TEACHING TEAM CONSTRUCTION

2.1. Insufficient Awareness of Teaching Team

Teaching team consciousness is the main factor that influences the construction of modeling team. For a long time, the concept that peer is "enemy" has been common in the community of teachers. Most teachers consider their own development a personal matter.Therefore, in the process of building mathematical modeling teaching team, there are some phenomena, such as individual members are independent, stick to the original teaching methods, the number of teaching discussions and academic exchange activities among team members is low, and there is a lack of communication and cooperation among team members.Due to the lack of the concept of teacher cooperation, it is impossible to form the complementary advantages among the members, which greatly affects the improvement of the overall level of the teaching team.

2.2. Weak Teaching and Scientific Research Ability

The teaching and scientific research level of mathematics modeling teaching team members directly affects the whole level of modeling guidance.Because the teaching organization of most colleges and universities is still based on the guiding ideology of discipline, the implementation of branch teaching mode, the communication activities of teachers in different departments and disciplines are very limited, and the cooperation among teachers is mostly the same department.Therefore, at present, the mathematics modeling teaching team is basically composed of all the mathematics teachers, without the participation of other members such as professional teachers.The homogeneous composition of the teaching team of mathematical modeling inevitably leads to the problems of teachers'short vision and weak innovation ability, which makes the teaching activities of mathematical modeling difficult to play its real effect.

2.3. Lack of Team Management System

At present, mathematical modeling teaching team is lack of management system.In general, there is no

department for the establishment and management of mathematical modeling teaching team in colleges and universities.Therefore, in terms of team building and management, only using the mathematics teaching and research office and existing departments to distribute the teachers, there is no professional management system, and no rules and regulations for supervision and management. As a result, the teaching team generally attaches importance to scientific research, neglects teaching, emphasizes theoretical teaching, neglects experiment and guides teaching, which seriously restricts the development of mathematical modeling teaching team.

3. THE CONCRETE IDEA OF MATHEMATICAL MODELING TEACHING TEAM CONSTRUCTION

3.1. Optimize Team Structure and Improve Team Awareness of Members

In order to set up the teaching team of mathematical modeling, we should innovate the organizational structure and help the members to establish the team consciousness[3]. Mathematical modeling involves almost all branches of mathematics and is widely used in various fields. In addition, as far as individual members are concerned, members who need complementary skills interact with each other to form educational synergy.Therefore, it is necessary to organize and build teams, work together, advocate the intersection and integration of disciplines and directions, and improve team awareness.We should not only consider the teachers of different directions in mathematics, but also consider the professional teachers of different subjects, full-time and part-time teachers to work together, coordinate innovation, and achieve the construction goal of teaching team.Through the investigation and statistics of the professional direction and scientific research direction of team members, the main research direction of each team member can be determined to achieve complementary advantages. Meanwhile, based on the current discipline direction, the research direction that is really unreasonable among team members should be changed in a timely manner, while the urgently needed research direction that is short of team building should be supplemented as soon as possible through selection, recommendation and cultivation to establish a diversified modeling teaching team.

3.2 Strengthen Teaching Reform and Improve Team Teaching Level

The teaching team of mathematical modeling should study and study modern educational teaching theories seriously, establish the education and teaching concept of “student-oriented”, further clarify the goal and requirements of talent training, pay attention to the curriculum system reform, and construct the curriculum system with rich contents under the premise of consolidating the professional foundation and considering the scientific research direction according to the professional direction.The teaching team members must undertake the teaching of relevant courses, clarify the teaching reform direction of the courses, actively improve the teaching content, improve the teaching methods and means.Relying on teachers’teaching and scientific research topics, we will continue to enrich and expand the teaching content.On the basis of learning professional courses, we should know the development and current situation of related disciplines in time, expand the knowledge of students, so that the curriculum teaching not only emphasizes the imparting of knowledge and content, but also pays more attention to the comprehensive and coordinated development of students’ knowledge, ability and quality.

3.2.1. Pay attention to the infiltration of modeling ideas in basic courses

At present, the basic mathematics courses for most students focuses on the ideas and methods of mathematics, and the examples and exercises in the corresponding teaching materials are mostly abstract mathematical problems. After learning the basic mathematics courses, the students are not good at using the mathematical theory and methods to solve the problems encountered in the major due to the lack of guidance of mathematical modeling thought. Therefore, in the teaching of basic mathematics courses for students, We should select the important knowledge points of basic courses, design appropriate teaching cases of mathematical modeling for these knowledge points, through the analysis and solution of the cases, make students realize the important role of mathematics in the application, and be able to use the knowledge learned to solve these problems, so as to realize the integration of modeling ideas and basic courses of mathematics.

3.2.2. Pay attention to the penetration of modeling methods in professional courses

Now, in the stage of higher education, the importance of setting up a series of mathematical modeling courses is increasingly prominent. Many local colleges and universities have set up a series of mathematical modeling courses for students. But in fact, it is not the only way to educate students about mathematical modeling, although it is an important way to cultivate innovation ability. What is more important is to infiltrate the ideas and methods of

mathematical modeling in professional basic courses and professional courses. For example, in the classroom teaching of operations research and quantitative analysis methods, teachers should be good at connecting with practice to reflect practical application and pay attention to the teaching of mathematical modeling, so as to enhance students' ability to solve practical problems creatively.

3.2.3. Pay attention to the penetration of model application in role exchange

Generally speaking, students are limited by their own knowledge and scientific research practice, so they seldom encounter practical modeling problems and solve fewer practical problems by themselves. As a result, it is difficult to grasp the essence of the problem.In view of this situation, we can use the way of role exchange in teaching activities, that is, let students put themselves in the perspective of actual workers to think, analyze problems and seek solutions to problems.

3.3. Promote Development by Competition and Enhance The Scientific Research Ability of The Team

Without high-level scientific research teachers with innovative ability, it is impossible to cultivate students with strong modeling ability[4]. Taking mathematical modeling contest as the impetus to carry out the follow-up study of the contest questions and other activities can not only further enrich the modeling theory and teaching methods, but also greatly improve the scientific research ability of team members.

3.3.1. Combining modeling competition with theoretical innovation

Modeling competition problem is usually based on the hot and difficult problems in real life, has high research value and due value, but due to various factors such as race time constraints, need to be simplified, so that the problem, and the original problem have some discrepancy, after the contest, around the problem develop problems as a result, there are many worthy of discussion through the research on the problem the following activities, can further enrich theory innovation method, for the major issues in the field of auxiliary decision-making to provide quantitative reference basis.

3.3.2. Combining modeling contest with Thesis Writing

Writing scientific and technical papers is an important aspect to measure a teacher's academic ability. Due to the basic subject, mathematics teachers in science and technology thesis writing often encountered when a problem is to find the breakthrough point, and the problem of modeling is a bridge connecting theory and practice, so in view of the problem worth deep mining problem of positive study, then the results of the study published in the form of academic papers, is to follow both deepened the modeling activities, but also promote the teachers' scientific research and academic ability.

3.3.3. Combining modeling competition with subject declaration

Teachers should have the consciousness ability and quality to carry out project research and actively carry out project approval and declaration work. First of all, project declaration requires that the source of the project should be real and reliable, which has certain research value and application prospect. Try to use the competition title as the blueprint, expand, process and transform some of the local problems, and try to apply some challenging problems as scientific research projects, there will be a lot of research space, so as to improve teachers' scientific research ability.

3.4. Promote Policy Support and Improve Management Safeguards

The construction of mathematical modeling teaching team needs the support and promotion of various policies[5]. As mathematics is a typical basic discipline, teachers need a solid mathematical foundation to engage in the research of mathematics, and it is difficult for general teachers to start scientific research. Therefore, in addition to providing necessary support in modeling competition activities, schools should also pay full attention to the construction of teaching teams. For example, in the school level projects, the project is inclined to support the teaching reform, teaching and research around the theme of mathematical modeling; in the external communication, the support is inclined to encourage the majority of modeling instructors to widely participate in the theme conferences with mathematical modeling as the center of learning and exchange, such as National Conference on Teaching and Application of Mathematical Modeling, National College Students Mathematical Contest in Modeling and Experience Exchange Meeting. At the same time, the school regularly organizes teachers' seminars, and instructs teachers to prepare lessons, select or design cases and explain novel case analysis questions in turn every week. In this way, the scientific research ability of each teacher will be significantly improved, and then scientific research can nurture mathematical

modeling teaching, so that the overall level of the team can achieve a qualitative jump.

4. PRACTICE ACHIEVEMENTS OF MODELING TEACHING TEAM CONSTRUCTION IN OUR COLLEGE

Since 2002, our college has organized students to participate in modeling competition activities. In the past 20 years, driven by various policies such as the establishment of the school's educational reform, we have made outstanding achievements in the mathematical modeling competition for college students, cultivated a group of applied talents with innovative ability and good theoretical foundation, and cultivated a mathematical modeling teaching team with comprehensive development in teaching and scientific research.

4.1. The Teaching Effect Was Significantly Enhanced and The Students' Mathematical Modeling Ability Was Improved.

While completing the basic teaching tasks, members of the modeling team actively build various application environments for students, encourage students to take part in the national mathematical modeling competition of college students, military modeling competition of military colleges and universities, and test their ability level. Through participating in the training, students' mathematical modeling ability and teachers'teaching ability have been greatly improved.

In recent years, more than 9500 students have been trained, with solid mathematical skills and outstanding knowledge application ability, laying a solid foundation for the follow-up professional courses. 675 students have successively participated in the national mathematical modeling competition for college students and military modeling competition for military colleges and universities, and won 224 provincial and ministerial first prizes and above. The "canteen dining queuing model" and "field military comprehensive exercise safety risk assessment mathematical model" established by students with mathematical knowledge have solved the hot and difficult problems in daily management and military training activities,and it was reported by PLA Daily on November 28, 2007 and June 22, 2014. Through the practice exercise, the student's application consciousness is strengthened, and the innovation ability is enhanced.

4.2. Continuous Innovation in Teaching Research Has Given Birth to a Number of High-quality Teaching Reforms and Practical Achievements.

In recent years, members of the modeling teaching team have published more than 30 research papers on modeling, among which 10 papers have won awards in various teaching seminars inside and outside the military, have compiled 5 military cases and recorded 11 microlessons; the 13th Five-Year Plan of Education Science of Shaanxi Province and the follow-up study of mathematical modeling competition were conceived. The results of empirical practice and reform practice, as a keynote speech was delivered at the 13th China Industrial and Applied Mathematics Conference held in Kunming in August 2014, and at the Xi'an Military Academy Mathematics Course Teaching Reform Seminar held by Air Force Engineering University in July 2019.

4.3. Outstanding Achievements in Team Building Have Forged a Course Team That Attaches Equal Importance to Teaching and Research As Well As Business Excellence.

In terms of the construction of the teaching staff, the modeling teaching team has explored a set of practical methods, focusing on the role of mentoring, actively creating conditions for the growth of young teachers, paving the way, building ladders, and daring to bear the burden, so that young teachers can accept challenges in the teaching practice, constantly experience, and strive to improve their teaching ability and business level. Five people won the first prize in the biennial mathematics curriculum innovation teaching competition in military colleges, one won the third prize of the third national mathematics modeling micro class competition; four participated in the young teachers' lecture competition in Shaanxi Province, all won the first prize; 2 took part in the National Defense University of science and technology teaching expert competition, won the third prize, young comrades grew rapidly in the exercise.

5. CONCLUSION

Through years of exploration and practice, we believe that optimizing team structure, strengthening teaching reform, enhancing scientific research ability and improving guarantee measures have a good promoting effect on the construction of mathematical modeling teaching team. It not only promotes mathematical modeling teaching and competition guidance, but also trains a mathematical modeling teaching team with comprehensive development of teaching and scientific

research, which lays a good foundation for further carrying out mathematical modeling curriculum reform and research.

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