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A Study of Stratified Teaching of College Mathematics

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Abstract **– Stratified teaching of college mathematics is an important teaching method to teach students in accordance with their aptitude, respect their personality, give full play to their specialty, cultivate their innovative ability and improve their mathematical quality in an all-round way. The implementation methods of stratified teaching of college mathematics are: to determine the teaching level, to formulate the teaching syllabus of each level, to set the teaching objectives of each level, to reasonably stratify students, to implement stratified teaching for teachers, and to conduct stratified course assessment. In the stratified teaching of college mathematics, we should improve the existing teaching management mode and the teaching and knowledge level of teachers. Through the hierarchical teaching of college mathematics, every student's mathematical potential and innovation ability can be fully developed.**

Keywords **– College Mathematics, Stratified Teaching, Individualized Teaching, Student, Innovation Ability.**

I. THE PROPOSAL OF STRATIFIED TEACHING OF COLLEGE MATHEMATICS

College mathematics course plays an important role in the course system of colleges and universities. It is a basic discipline that trains students' rigorous logical thinking, rigorous scientific attitude and meticulous working spirit, and integrates theory, tools and ability, and is paid more and more attention by all majors [1]. All majors hope to lay a mathematical foundation for students' professional study through college mathematics education, and at the same time hope that students can accept the influence of mathematical culture, master mathematical thinking methods, enhance mathematical quality, learn rational thinking, improve the ability to analyze and solve problems, so as to adapt to the new requirements of social development for talent quality. Yanbian University is a comprehensive university with distinctive national characteristics. It is a key construction University of the "211 Project" of the state, a key construction University of the western development, and a key university jointly supported by Jilin Province and the Ministry of education. The university has 71 undergraduate majors in 10 disciplines, which are open to national enrollment. Among the students admitted by agricultural college, there are one batch and two batches of students, and some counterpart students and preparatory students. There are certain differences in student foundation. How to do a good job in college mathematics teaching, so that the teaching not only meets the common requirements of the cultivation of professional talents for higher mathematics, but also meets the needs of the development of different levels of students, and promotes the rapid growth of outstanding talents, which is a prominent problem in the process of College mathematics teaching. "Stratified teaching" is exactly a teaching mode which conforms to the above problems. According to the requirements of quality education, stratified teaching is an important means to change the one size fits all teaching mode, overcome the disadvantages of traditional teaching, and teach students according to their professional needs, learning ability and acceptance. It is a necessary educational measure to teach students in accordance with their aptitude, respect their personality, give full play to their specialty, and lay a foundation for training multi-level and multi-standard talents [2]. Its research and practice is of great significance to the establishment of modern education concept, the improvement of basic course teaching quality and the cultivation of students' innovation ability.

II. THE IMPLEMENTATION METHOD OF STRATIFIED TEACHING MODE OF COLLEGE MATHEMATICS

1. *Determination of Teaching Levels*

The stratified teaching of College Mathematics refers to breaking the traditional teaching mode of taking department and class as the collective, and dividing students into different levels according to their actual level. In general, a small number of students with good foundation, strong learning ability and high learning enthusiasm will be formed into level a, students with poor foundation and obviously slow learning speed will be formed into Level C, and most of the other students will be incorporated into level B, and teachers will conduct targeted teaching according to the learning ability of students at all levels.

2. *Making Syllabus for all Levels of Teaching*

The syllabus of each level of teaching should be related to each other, progressive and different. For the students of level a, they should meet their needs for further study in the future. The syllabus of level a should meet the requirements of the syllabus of the national unified entrance examination for postgraduate students in agronomy [3] formulated by the Ministry of education. For the students of level B and level C, they should take “necessary” and “sufficient” as degrees, so that they can master the basic mathematical knowledge and ability necessary for learning professional courses. For the students of level B and level C, they should take “necessary” and “sufficient” as degrees the syllabus should meet the basic requirements of mathematics course teaching formulated by the science basic course teaching steering committee of the Ministry of education, but there can be differences in the teaching schedule.

3. *Set Teaching Objectives at all Levels*

Clear teaching, diversified teaching, task orientation, guiding students to invest in the learning process and ensuring the success rate of students are the key behaviors of effective teaching. The effectiveness of classroom teaching depends on the clear setting and implementation of teaching objectives [4]. Therefore, the stratification of teaching objectives is an important part of the implementation of stratified teaching. The teaching objectives should be determined according to the syllabus and teaching contents, and from the actual situation of students at different levels. It must conform to the cognitive characteristics and abilities of students at different levels. The learning results of students at various levels can be predicted preliminarily through the designed learning objectives. In view of the difference of students’ mastering degree and accepting ability of basic knowledge and skills in three levels of a, B and C, the teaching objectives of different levels of teaching are designed as a whole. For A-level teaching, students have a good foundation of primary mathematics, strong desire for knowledge and strong self-study ability. The teaching goal should focus on improving ability, strive to speak deeply, broaden the knowledge, supplement some postgraduate mathematics, modern mathematics content and thinking methods, guide students to drill and study mathematics competition questions, carry out mathematical modeling training, and cultivate students’ divergent thinking and innovation ability. For level B teaching, the overall quality of the students is slightly inferior to that of the students who are teaching level a, the teaching contents should be widened and deepened appropriately, the extra-curricular assignments should be supplemented and the questions should be improved properly, the students should master the basic theoretical knowledge and mathematical thinking methods, focus on understanding and application, strive to be precise, and gradually cultivate the students’ ability

to analyze and solve problems. For the C-level teaching, the students' elementary mathematics foundation is poor, and their ability to accept and reflect the new content is slow. It is advisable to step by step, cultivate interest, consolidate the foundation, focus on the cultivation of basic knowledge and ability, desalinate theory teaching, pay attention to application, strive to speak well, reasonably control the teaching progress, and meet the minimum requirements specified in the syllabus based on the principle of "Sufficiency".

4. *Student Stratification*

In the process of new students' stratified class arrangement, the college should hold a mobilization meeting to let students understand the purpose and method of university mathematics curriculum stratification, recognize and accept this mode, eliminate their possible unbalanced psychology, and avoid hurting students' enthusiasm in the practice of stratified teaching. The arrangement of classes is mainly decided by the students themselves in combination with their own mathematics achievements, considering their own interests and academic needs, whether to take the postgraduate entrance examination, etc. in the first two weeks of the semester, the students are allowed to listen to the class, adjust themselves according to their own actual situation, and choose a class suitable for their own level. At the same time, the dynamic stratified teaching is carried out. After the semester, according to the students' learning situation and personal wishes, the class is selected again to listen to the lessons, so that the students are always in the collective suitable for their own development, and the individual growth of the students is respected to the maximum extent.

5. *Teachers' Stratified Teaching*

Teachers should fully understand the needs of various majors for college mathematics, and the teaching content should reflect the practicality. The teaching and research section should often hold teaching seminars to exchange and reflect on each other. On the basis of a thorough understanding of the syllabus and teaching materials, the teaching should be prepared in groups according to the teaching level. The teaching classes at different levels should choose appropriate teaching methods and teaching methods, carefully design all aspects of classroom teaching, build a harmonious classroom, form a successful incentive mechanism, and ensure that every student has progress. In the classroom teaching, the methods of self-study guidance, discussion, inspiration, analysis and intensive teaching can be used for the teaching of a and B levels to provide the space for students to think and explore, and make mathematics teaching become an important way to inspire students' wisdom, develop students' potential and innovation ability. For the C-level teaching, we can adopt the methods of heuristic guidance, conversation teaching and combination of teaching and practice, pay attention to step-by-step, grasp the teaching progress, strengthen extracurricular guidance, and encourage students to organize their own exercises. In addition, in order to improve the students' mathematical cultural quality, we should add some knowledge of mathematical history and the relationship between mathematics and other cultures.

6. *Assessment Hierarchy*

The course assessment should reflect the different objectives of each level of teaching, and the examination forms should be diversified, mainly including the usual results and the final examination results, accounting for 30% and 70% respectively. The usual results include homework, attendance, questions, speeches, answers, etc., and this part of the achievements should especially reflect the evaluation of students' creative learning, no matter what level the students are at in teaching, as long as valuable problems and certain solutions are put forward, the

usual performance will be assessed as full score. In the final examination, the ways of separation of examination and teaching, collective proposition, collective marking and collective analysis are adopted. The content of the test paper can be divided into three parts, corresponding to three levels of teaching. The first part is the standard test, which mainly tests whether the students meet the basic teaching requirements. This part is the three levels of students must answer the paper, 70% of the results as the final examination results. The second part is to improve the volume, a, B level students must answer. The third part is the difficulty volume, which must be answered by students of level a. Low level students can also do the necessary test paper of the upper level, and the results are the basis for entering the upper level. The second and the third parts are not the final examination results, but the standards to test the learning effect and the flow between different levels of students. In the arrangement of examination time, it can be divided into three time periods, according to which the students can collect the examination papers in time. In this way, multiple considerations are achieved, which not only mobilizes the enthusiasm of students' learning, but also avoids the adverse effects that may be caused by students' course assessment results on other assessment during the school period. Through the course assessment, strive to find out objectively the learning status of each student in the university mathematics course, so that all students can achieve better results through their own efforts and enjoy the joy of success [5].

III. Problems to be Further Solved in Stratified Teaching of College Mathematics

The implementation of stratified teaching is mainly to provide better services for students with different bases and needs. This is a new work, in the process of implementation, we will encounter various difficulties, especially bring some problems to the teaching management department. First of all, the layered teaching breaks the original class boundary, and the reorganization of classes will inevitably cause difficulties to the management of students. Secondly, the implementation of stratified teaching requires the implementation of interdisciplinary teaching and stratified assessment at the end of the term, which will bring some troubles to the teaching management department in formulating curriculum, arranging classrooms, arranging the final examination and other activities. Therefore, the existing teaching management mode needs to be further improved.

The implementation of stratified teaching puts forward higher requirements for teachers' teaching and knowledge level, which not only requires teachers to master classical mathematics knowledge and conventional mathematics teaching ability, but also requires teachers to have stronger ability to teach students according to their aptitude in the face of students at all levels; in the face of students of different majors, teachers are required to understand the follow-up courses of corresponding majors and master more modern mathematics knowledge. We should have a team of teachers who are able to study business, devote themselves to teaching reform, teaching and research, and have a strong sense of responsibility. Therefore, at present, teachers' teaching and knowledge level need to be further improved.

IV. Conclusion

Stratified teaching of college mathematics is a new teaching mode, which creates a successful environment for every student, and meets the needs of individualized teaching and comprehensive education. In the process of implementation, as long as the majority of teachers continue to study and practice, improve the teaching and knowledge level in an all-round way, with the active cooperation of the teaching management department, and

constantly improve and revise in the implementation process, good teaching results will be achieved, so that every student's mathematical potential and innovation ability will be fully developed.

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