

# Research on the Concerted Cultivation of Mathematics Teachers in Rural Primary and Middle Schools Based on the Trinity -----A Case Study of Cultivating the Guidance of Mastering Core Literacy of Normal Students Majoring in Mathematics

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**ABSTRACT.** As basic education reform goes deep, a group of high-quality teachers with dedication is urgently needed for the reform and development of rural primary and secondary education. Therefore, it is urgent to train the normal students of mathematics major in normal colleges and universities into a high-quality and specialized mathematics teacher in rural primary and secondary schools with high integrity, solid professional foundation, outstanding ability of education and teaching and self-development. Firstly, this paper first introduces the significance of concerted cultivation of mathematics teachers in rural primary and secondary schools in colleges and universities based on "trinity ". On this basis, it further studies how to train the normal students of mathematics major in colleges and universities to master core literacy-oriented teaching skills, educational skills and research ability.

**KEYWORDS:** Trinity, Concerted cultivation, Mathematics teachers

## 1. Introduction

A hundred years account greatly, education is origin. Education is very important in training the teachers. In recent years, many excellent township primary and secondary school teachers' rush into the county and urban areas for a variety of reasons, making rural education inherently weak. As basic education reform goes deep, a group of high-quality teachers with dedication is urgently needed for the reform and development of rural primary and secondary education. Therefore, it is

urgent to train the normal students of mathematics major in normal colleges and universities into a high-quality and specialized mathematics teacher in rural primary and secondary schools with high integrity, solid professional foundation, outstanding ability of education and teaching and self-development. It carries out the concerted cultivation of mathematics normal students based on the "trinity" of universities, governments and primary and secondary schools. As a mathematics teacher in first-line middle school, I have carried out the practical exploration train high-quality and specialized rural primary and secondary school teachers for many years by cooperating with higher vocational colleges, and have provided long-term guidance to normal school students on teaching and learning, practice and study, which achieved good results.

## **2. The important significance of cooperative training of mathematics teachers in rural primary and secondary schools in colleges and universities based on "trinity"**

### ***2.1 Implementing the State policy on education***

In 2014, the Ministry of Education proposed the implementation of the "Trinity" model of cooperation between universities and local governments and primary and secondary schools to train outstanding primary and secondary school teachers, so that the overall deepening of curriculum reform, the implementation of the fundamental goal of building up people, comprehensive development of students' core literacy can be really promoted.

### ***2.2 Strengthen the resultant force of colleges and universities and primary and secondary schools in training talents***

In the past, colleges and universities focused more on the theoretical study of normal students during their college years. It was not until the last semester before graduation that they were arranged to practice in primary and secondary schools for one or two months. In the short-term teaching practice, their teaching experience is still very scarce.

### ***2.3 Promoting the development of basic education in rural areas***

Because the main employment direction of normal college students is rural primary and secondary schools, therefore, "Trinity" concerted cultivation of high-quality specialized rural primary and secondary school teachers is of great significance to promote the development of rural basic education.

### **3. Training the normal students of mathematics major in normal colleges and universities to master the teaching skills guided by core literacy**

Core accomplishment refers to the essential character and key ability that students should possess for the purpose of meeting the needs of lifelong development and social development. The core accomplishment is concertized through the discipline, so as to form the discipline core accomplishment.

The core accomplishment of mathematics includes the following six aspects, such as mathematical abstraction, logical reasoning, mathematical modeling, mathematical operation, visual imagination and data analysis. We should carry out the cultivation of the core accomplishment of mathematics subject through subject teaching and students' practical activities, which requires our mathematics normal students to master the core literacy-oriented teaching skills.

#### ***3.1 Mastering pre-class preparation strategy***

The preparation of classes is the premise of classroom teaching and the necessary conditions to improve the efficiency of classroom teaching. As normal students, we should prepare lessons before class from the following aspects:

##### ***3.1.1 Preparation of materials***

Teaching materials are important materials for teachers to teach and students to learn. Teachers should understand and master the teaching contents of teaching materials, including the essence of mathematical concepts, between chapters before and after, between modules, between mathematics and other subjects, as well as examples, the selection of classroom exercises and so on. For the new teacher, he/she also has to understand the content of next few class hours, it is best to master the whole chapter of knowledge ahead of time, so that we can have a plan and connect knowledge better while preparing lessons. We should study the teacher's teaching books carefully, and find out the teaching hours of each chapter and textbook analysis, each section of knowledge structure, teaching emphasis and difficulties, textbook preparation intention and teaching advice. On this basis, new teachers can use teaching materials creatively according to their learning situation, and then accomplish their teaching objectives.

##### ***3.1.2 Preparing instructional design***

We should determine the teaching goal, namely, what to achieve through some certain means, what to cultivate through some means, what to experience and what to infiltrate, so as to carry out the cultivation of students' mathematics subject literacy, and then determine the key points and difficulties of teaching, how to highlight the key points and break through the difficulties in the teaching process.

The design of teaching process is the most important part of preparing lessons. The teaching process mainly includes the following aspects: introduction of new lessons, exploration of new knowledge, consolidation of new knowledge, review and reflection, assignment and other links. Mathematics comes from and serves life.

For example, when we prepare a new class, it is necessary for us to introduce new courses based on students' familiar life, create situations, stimulate students' interest in learning mathematics, and let mathematical concepts be naturally introduced and accepted by students. We can let students experience the process of knowledge exploration with their own practice, stimulate students' perceptual thinking and the desire to explore knowledge, understand the joy of success through the design of independent inquiry, group cooperative inquiry and other activities to explore new knowledge. We may also explore new knowledge, and create problem situations, so as to effectively arouse students to think. The difficulty of the problem which the teach designs should be in line with the actual level of the class students taught, so that most students in the classroom can think positively and solve problems. We shall consolidate new knowledge and make a summary, sum up the analysis of the problem, problem-solving methods and steps and error-prone points. The examples of consolidating new knowledge can be designed according to students' learning situation, from shallow to deep, from easy to difficult. Review reflection is a summary of the main knowledge learned in this lesson, which can be reviewed by students and teachers respectively. The assigned assignments should be aimed at the knowledge learned in this class so that students can consolidate and improve after class, and further master the skills of solving problems with relevant knowledge.

The new teacher are required to write the detailed lesson plans, write down every link in the classroom in detail, and reduce the mistakes in the teaching process. In particular, we should consider the language link between the various teaching links, the multi-explainable exercise and examples, but also the idea of blackboard design.

### ***3.2 Mastering mathematics classroom teaching strategies***

#### ***3.2.1 We should adopt flexible and changeable teaching methods***

We may guide the students to actively discover and solve problems through observation, experiment, analysis, conjecture, induction, analogy, association and other thinking methods based on the situation of the students. We may adopt the comprehensive teaching mode, such as inspiration and guidance, self-inquiry, group cooperative inquiry, peer mutual evaluation, teacher review and so on, which not only pays attention to the teaching of basic knowledge, but also pays attention to the cultivation of students' learning ability, and encourages students to question more and think from many angles.

#### ***3.2.2 Focusing on presenting natural mathematics***

Mathematics is natural, the content of mathematics that appears in the textbook, is the essence and foundation of mathematics that has been refined in human long-term practice, and the origin and development of mathematical concepts, methods and ideas are all natural [1].

Therefore, in the process of teaching, we should try to make every mathematical knowledge point naturally present in front of students, so that it can be learned and understood easily by students.

### ***3.2.3 Teaching students to analyze the questions***

Students often feel that mathematics is flexible and changeable, the concepts, theorems, and formulas are difficult to be remembered, and do not know how to solve the problems. Therefore, we should teach them to analyze the questions in the teaching process. When we are about to solve the question, we shall understand sentence by sentence, and draw useful known conditions with pen, understand each known condition thoroughly, or we can evolve more concise known conditions. We can also analyze the question and then judge that whether we can use direct method to solve the problem, or use the analysis method from the problem, or solve the problem by turning the problem into another problem.

### ***3.2.4 Paying attention to the way of thinking of students and guide students to think about problems***

The method of solving problems in mathematics is often not the only one, and the way of thinking of each student is also different. In the process of solving problems in mathematics, we should first give time students to try to solve problems independently, and let students state their thinking of solving problems, or let students demonstrate the process of solving problems on board, then let the peer of the study group evaluate each other, next, asking the other students to find different methods of solving problems, and finally, the teacher sums up the problem-solving methods.

### ***3.3 Mastering the strategy of after-school tutoring and testing***

With respect to the after-class assignments, we should assign the layered homework according to the level of students, for example, the required questions and optional questions. Each assignment should be carefully corrected, so that the feedback on teaching effect can be made and learning effect can be understood timely. After-school tutoring should be divided into poor students tutoring, top students tutoring, edge students tutoring, so as to ensure that different students have different harvest. In terms of the ways of mentoring, there are one-to-one, one-to-many tutoring, and the class can be divided into several study groups. In order to timely feedback the effect of teaching and learning, a quiz should be finished whenever each chapter is learned. We should promote students' learning effect through the quiz. The test paper should be correct timely, and then targeted comments should be conduct timely.

## **4. Training the normal students of mathematics major in normal colleges and universities to master the core literacy education skills**

### ***4.1 We should strengthen teachers' moral cultivation and carry out the fundamental task of foster character and civic virtue***

We should conscientiously carry out the fundamental task of foster character and civic virtue, take the core accomplishment as the important goal of educating people,

and strive to cultivate students into a person with all-round development. Focus on first-tier education and teaching, and try our best to guide students.

We should love students, and implement it in the specific students and in the daily relationship between teachers and students. As teachers, we should be approachable, strict but also kind and deal fairly with students. Only when the students trust their teacher, can they listen carefully to the teachers in class. The harmonious relationship between teachers and students is conducive to the development of education and teaching. When meeting students with problems, we should talk calmly and help students find problems, analyze problems and solve problems. Every student is unique, we should attentively understand students, attentively pay attention to students, attentively listen to students.

#### ***4.2 Concentrating on educating people, caring for students, and being a good guide to students***

##### ***4.2.1 Class management***

At the beginning of the class building, a class committee with a strong sense of responsibility should be set up to formulate the responsibility system for class cadres. The class management system and convention shall be jointly formulated by the whole class, and the class cadre value week system shall be implemented every week. We shall implement the system that the class cadres is on duty weekly, and the daily affairs of the class are managed by the class cadres who are on duty. We can divided the class into groups and implement the team leader system by taking the group as the unit, which is responsible for collecting the homework of each discipline, managing the discipline, style of study, and hygiene,etc.

##### ***4.2.2 Construction of class style and study style***

"The right class style may lead to the right style of study, students can achieve good results only when style of study is right ." All the students should establish a practical and serious attitude towards study and life, so as to create a pure class atmosphere, a good class atmosphere and form a hard-working and enterprising team spirit, and a strong class cohesion. The specific approaches to create a good class style and style of study includes the following:

Carrying out a good theme class meeting. The class management alone is not enough. It is also necessary to do a good job of moral education for students, namely, to convince people with reason. Moral education is the most important part of the class teacher's work, and the theme class meeting activity is an important way to carry out moral education. We may look for the students' common problems by carefully observing the student's daily behavior. We should carry out the ideological, moral and psychological education for students through focusing these problems, so as to promote the formation of correct class public opinion.

Creating a good learning environment. The head teacher should guide the students to build the class culture, set up the study garden, set up the blackboard newspaper, and paste the famous aphorisms, class slogans and so on. With the help of class culture construction, we can create a class atmosphere of equality, unity,

mutual assistance and harmony, and embody the positive class style and features, so that the collective and every student can grow up healthily.

Doing a good job of students' ideological work. Teachers should conduct the consciously, planned, and hierarchical individual talks to students, timely praise and criticism of those typical cases, so as to form a correct collective public opinion guidance in the class. There are more typical problems in the class, such as being late for school, "puppy love" problems, and these problems can be discussed in the form of thematic class meetings, thus letting students analyze themselves and conduct the self-evaluation. For students who have problems in such areas as lax discipline, unclear learning goals and inadequate hygiene, we may find the right time to talk individually and teach him the right way to deal with problems and solve them. We should pay special attention to the stay-at-home children, children of single-parent families, and give them more care and love. We should also pay more attention to the psychological problems of students, timely dredge their psychology, so as to make the students' physical and mental develop healthy.

#### ***4.3 We should strengthen the communication between home and school, enhance the resultant force of home and school education***

Parents are the first teachers of children, and the influence of family plays a very important role in the development of children. Therefore, it is very important for us to obtain the cooperation of parents in our educational work. The specific practices are as follows:

##### ***4.3.1 Establishing parent groups and establish parent committees***

##### ***4.3.2 Holding regular parents' meeting and arousing the enthusiasm of parents to participate it***

##### ***4.3.3 Carrying out the home visits to problem students***

### **5. Training the normal students of mathematics major in normal colleges and universities to master the core literacy-oriented research**

#### ***5.1 Selecting research topics***

We will encounter a lot of problems and puzzles in the process of education and teaching, and choose one of the problems and puzzles to study as a subject.

#### ***5.2 Developing research programme***

We should determine the research objectives, contents, methods and steps of the project. The research steps are generally divided into preparation stage, implementation stage and conclusion stage. Develop a research program for each stage, identify the research tasks and responsible persons for each stage, and estimate the time to complete the research and the stage results.

### **5.3 Unfolding the research process**

According to the research plan of the subject, the members of the research group carry out research on the research objectives and contents in education and teaching according to the different division of tasks. We should pay attention should be paid to collecting materials and prepare for the summary of the subject in the process of research.

### **5.4 Summarizing the topic and write the paper**

We can summarize effective teaching methods through studying the research process, research methods and scientific, and then writing a paper regarding to the effective summary of experiences or typical examples in the course of a research project and then publish the paper in the publication.

In short, the concerted cultivation of mathematics normal students in school based on "trinity" in colleges and universities, the government, primary and secondary schools improve the resultant force of talent training, improve the quality of talent training of normal students, and promote the professional level of teachers in rural primary and secondary schools. In the meanwhile, it also promotes the reform and development of rural primary and secondary education.

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### **References**

- [1] A edition of General High School Curriculum Standard Experimental Textbook Mathematics
- [2] Gao Lunqing, the Practice Inquiry of the "Trinity" Concerted Cultivation Model of Excellent Teachers, Courses. Teaching materials. Teaching methods. July. 2015.
- [3] Yu Wensen, Core Literacy-oriented Classroom Teaching, Shanghai Education Press.
- [4] Ren Yong, You can be the best math teacher, East China Normal University Press.