



## The cultivation of graduate student in mathematics education based on core literacy

<sup>1</sup> Zezhong Yang, <sup>2</sup> Haizhen Zhang, <sup>3</sup> Yanqing Zhang

<sup>1</sup> Ph.D. The School of Mathematics and Statistics, Shandong Normal University, Jinan, China

<sup>2,3</sup> M.A. The School of Mathematics and Statistics, Shandong Normal University, Jinan, China

### Abstract

Developing the core literacy of students is the latest requirement of education reform in China. In order to keep in line with these new changes, the graduate students in mathematics education should strengthen the learning of education theoretical knowledge, professional knowledge and modern information technology. They should pay attention to the improvement of education practical ability, scientific research ability, management ability to cultivate their good personality and unique teaching style.

**Keywords:** core literacy, mathematics, graduate student in education, cultivation

### 1. Introduction

As a new concept, the Core literacy appeared in national documents in March 2014 firstly. In the document titled the comment about comprehensively deepening reform, implementing the basic tasks of setting high moral values and cultivating person issued by Ministry of Education, the core literacy was placed at a basic status about deepening curriculum reform, setting high moral values and cultivating person.

Developing the core literacy of Chinese students need to follow the principles of scientificity, nationality and epochal character and centers on cultivating all-round development of people. It is divided into three aspects: cultural foundation, independent development and social participation, shown in humanistic connotations, scientific spirit, learning to learn, healthy living, responsibility, practice and innovation <sup>[1]</sup>.

In terms of mathematics, mathematical core literacy is the necessary mathematical thinking quality and key ability that mathematics learners should have to adapt to life-long and social development. It is also a comprehensive ability for students to achieve a specific meaning in mathematics, and it should arouse the attention to teachers and students in the process of teaching and learning. The core literacy of mathematics is based on mathematical knowledge and skills and takes the use of mathematics and knowledge and skills to solve problems as a form of expression, reflects the essential characteristics of mathematics and related mathematical thinking and formed gradually in the process of mathematics learning <sup>[2]</sup>. Mathematics core literacy includes mathematics abstraction, logical inference, mathematical modeling, intuitive imagination, mathematical operation and data analysis. These qualities are independent and integrated forming an organic integer.

The core literacy is the standard of education and the baton of education reform. Cultivating students' core literacy has put forward many new demands on teachers. The cultivation of graduate student in education should also combine with the

reform requirement. How to cultivate graduate student in education suitable for cultivating students' core literacy is a question to concern.

### 2. The Cultivation of Graduate Student in Mathematics Education

The core literacy demands to cultivate all-round developing people that is to ask students to have a variety of qualities. Therefore, teachers should also have comprehensive qualities to cultivate students' core literacy. Then they can do well in classroom teaching. What kind of qualities that the graduate student in mathematics education should have as a per-service teacher? What kind of guidance should give to the graduate students in mathematics education? What should be taught to them? What kind of teaching method should be used? And to what extent?

#### 2.1 Cultivating Graduate Students in Mathematics Education Rich Educational Theoretical Knowledge

Graduate students in mathematics education will be mainly engaged in primary and secondary mathematics education. Pedagogy has a broad theoretical foundation, involved in philosophy, psychology, sociology, history and some other field. Therefore, teachers should have to dabble in a wide range of knowledge. The course of teachers' education is indispensable to graduate students in mathematics education. Education theoretical knowledge can guide educational practice in the teaching process <sup>[3]</sup>. As an independent discipline, mathematics has its own independent theory and knowledge system. Hence, in the process of cultivating graduate students in mathematics education, we should not only pay attention to the basic knowledge of pedagogy but also penetrate them with mathematics pedagogy, mathematics psychology, mathematics history and other education theory knowledge to make them understand the basic laws of mathematics education, then, they can make fewer mistake in education teaching.

## **2.2 Cultivating the Graduate Students in Mathematics Education Teaching Practice Ability**

Teachers' teaching practice ability is the comprehensive ability manifested in specific teaching. It mainly includes analyzing teaching materials correctly, designing classroom teaching, selecting the content and methods of courses, organizing teaching activities and so on <sup>[4]</sup>. Different from other disciplines, in mathematics teaching, we should not only pay attention to teaching basic knowledge, but also cultivating students' mathematical thinking ability. Therefore, it is necessary for graduate students in mathematics education to have the mathematical teaching ability, master the operation ability and the ability of cultivating students' thinking quality. So we should strength Micro-teaching training to cultivate communication ability in the process of cultivating graduate students in mathematics education. Studying middle school mathematics curriculum standard and teaching materials is an effective method to develop their teaching design ability <sup>[5]</sup>.

## **2.3 Combing Theory with Practice to Cultivate Graduate Students in Mathematics Education**

The study of theoretical knowledge is important, but it does not work if just have the theory of pedagogy but not to combine with practice. So, educational practice is an essential part of training graduate students in mathematics education. Educational practice can help them apply education theoretical knowledge and consolidate their mastery of these theories and deepen understanding <sup>[3]</sup>. In class, teachers should analyze more mathematical class cases, play some excellent and typical cases. Teachers also could summarize teaching methods of this case with students and analyze what kind of education theory are used in this cases. They can help students judge the cases' strengths and weaknesses and give them opportunity to practice. In this process, graduate students in mathematics education can learn from each other, absorb advantages and avoid shortages, they can truly combine theory with practice to promote the improvement of their teaching skills.

## **2.4 Cultivating the Graduate Students in Mathematics Education Strong Professional Quality of Mathematics**

Professional quality of is the basic quality that graduated students in mathematics education must possess. How can a teacher teach his students if he does not have the knowledge they taught? So graduate students in mathematics education should have a wide range of mathematics knowledge and further promotion on the basis of undergraduate study. Master of mathematics education should master mathematics knowledge systematically. They should not only master the subject you taught, but know the student's knowledge reserve and knowledge structures. It is necessary to have a comprehensive understanding of the course content of the whole middle and primary school. In this way, they can perform well in practice.

Nowadays, problem solving is the main objective of the new curriculum standard. It has received attention all round the world. Solving problem has a unique position in mathematics learning. A qualified mathematics teacher must be able to solve mathematical problems. They should not only be able to solve problems with students in the students' thinking level,

but also be able to look at the problem with a much higher level <sup>[5]</sup>. However the problem solving ability of graduate students in mathematics education is less than satisfactory, problem solving skills has been forgotten. Thus, in order to solve these defects fundamentally, it is necessary to give more train of this ares, especially focus on the generation of problem-solving skills. For example, we can analyze middle school mathematics teaching materials and college entrance examination math test paper, find the mathematical thought method to teach graduate students in mathematics education about mathematical methodology and mathematical solution theory <sup>[5]</sup>.

## **2.5 The Education Theory that Graduate Students in Mathematics Education Should be updated in Time**

The reform of basic education has been in full swing, and its core and purpose is to cultivate the core literacy of the students. Therefore, the cultivation of graduate students in education should be based on this, and the core content of education reform should be conveyed in time. College teachers should introduce the new contents of primary and secondary school curriculum in class, new ideas and methods of education reform and new phenomena in educational teaching. In this way, we can better to adapt to the development of the education reform and cultivate students' core literacy <sup>[6]</sup>.

## **2.6 Cultivating the Graduate Students in Mathematics Education Research Ability**

Modern teacher professional ideology emphasizes that teachers should change the role in traditional teachers to expert and academic type teacher. Cultivating students' core literacy is a long and complicated process. There will be many problems and difficulties in this process, this requires teachers to have the research ability to analyze and study the training programs which adapted to different students according to their actual situation. In particular, it is required teachers can use a series of operating principles, procedures and professional theories to understand education phenomenon, reveal education rules and solve problems.

The research ability of graduate students in mathematics education should be careful and operable. This includes the ability to select topic, obtain and utilize research literature, as well as determine research route, apply the correct methodology, explain and express the research results, master academic norms. For this purpose, college teachers should often organize education master reading, lead students to question. In addition, attending academic conference, opening report conference and thesis defense can cultivate education masters' scientific research ability and the sensitivity to education problem.

## **2.7 Cultivating the Graduate Students in Mathematics Education Management Ability**

The degree office of the state council has set up a professional degree of graduate students in education. The purpose is to cultivate teachers with modern education concept, theoretical literacy and education practical ability to promote the improvement of china's basic education and management level. Graduate students in education have strong management

ability can better serve the cultivation of students' core literacy. Hence, graduate students in mathematics education should not only master the theoretical basis and specialized the knowledge of mathematics, but also understand the basic theory of modern education and teaching management. In class, teachers should infiltrate class management knowledge into students, encourage them to express their opinions and communicated with their classmates to improve their management ability.

### **2.8 Cultivating Graduate Students in Mathematics Education the Ability to Use Modern Information Technology**

In the information age, multimedia assisted teaching enters classroom. Multimedia assisted teaching could combine word with picture to better arouse students' interest. It can increase classroom capacity, extend the students' scope of knowledge and save teaching time. Nevertheless, there are many formulas and figures need to be used in the mathematics class. Geometry teaching needs to be use flash to make dynamic picture. Editing those is a heavy workload, there is no doubt that it is a difficult task for teachers who do not understand multimedia. So, we should teach graduate students in mathematics education about the application of multimedia, such as making and designing courseware, using mathematics teaching software including the Geometer Sketchpad, Microsoft Mathematics teaching system of Algorithm diagram and so on.

### **2.9 Guiding Graduate Students in Mathematics Education to Develop Their Own Personality and Form their Own Unique Teaching Style**

It is a complex process to cultivate students' core literacy. In this process, teachers not only need to teach students knowledge, but also cultivate them with correct outlook on life, world view and value. The modern student view stress that students are developing people, and each student has his own unique personality. Similarly, teachers are also developing people. The character, hobby, habit, and ideal of teachers will exert a subtle influence on students. Teachers in new era should have their own distinct personality and unique charm, and use their charm to create a unique class. It can help students acquire knowledge, get guidance and edification from teachers, accordingly develop their own personality and core literacy. The collage teachers should give different guidance and demands with different personalities to cultivate unique teaching style of graduate students in mathematics education.

### **3. Concluding Remarks**

The cultivation of students' core literacy has raised higher and higher requirements for teachers. As a per-service teacher, there still has a long way to go to cultivate graduate students in mathematics education. Cultivating graduate students in education requires higher normal school, college teachers and themselves to make joint efforts, to make them adapted to the new curriculum reform and met the requirements of core literacy. Graduate students in education with education should be taught with theory knowledge, professional knowledge, and combining theory with practice. They should improve their education practice ability, scientific research ability, teaching

management ability and the ability to use modern information technology. It can make them have a comprehensive improvement to better fit educational work and accomplish the goal of cultivating students' core literacy.

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