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Research on courses of graduate students in mathematics education based on the core quality cultivation

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Abstract
Strengthening the cultivation of the core quality of middle school students is a new requirement of education reform in China. In order to meet this requirement, the courses of the graduate students in mathematics education should be based on the original contents and further absorbed the contents of related subjects. Meanwhile, it should carry out targeted practice according to the requirement of the core quality and reform evaluation methods. Furthermore, These courses also should highlight the evaluation of core quality teaching and so on. Only in this way can graduate students in mathematics education better adapt to the future teaching work.

Keywords: core quality, mathematics, graduate students in education, course reform

1. Introduction
Core quality mainly referred to the necessary characters and key abilities of students should adapt to lifelong development and social development needs [1]. It was divided into three aspects: cultural foundation, independent development and social participation. The comprehensive performance was the six major qualities of humanity, scientific spirit, learning, healthy living, responsibility and practice innovation [2]. September 13, 2016, the research achievements of Chinese students' core quality developments was officially promulgated by Beijing normal university. This indicated that the new direction of education reform was the Chinese students' core quality cultivation. This reform had put forward new requirements for primary and secondary school teachers. It also challenged the training of graduate students in education. The setting of graduate students in education was to training excellent teachers. In order to cultivate qualified teachers, how to reform the courses of graduate students in education is a question that needs serious consideration.

2. Requirements of teachers to cultivating the students' core quality
Core quality was the most basic, important and necessary quality of the individual in the society [3]. In order to achieve the training goal of core quality, teachers should set up a professional thinking to cultivate students' core quality and defining the contents of core quality. Teachers should try to put the training goal of core quality into teaching practices. Specifically speaking, middle school teachers should have the following qualities.

2.1 Cultural foundation
Teachers should have profound cultural foundation. They could master knowledge and skills in various fields such as humanities and science. They also could master and utilize the outstanding achievements of mankind and develop themselves into a person with a broad cultural foundation and higher spiritual pursuits. In the middle school mathematics courses, there would be many "exploring questions". The aim was to stimulated students' interest in learning and cultivated their core quality. These problems were not only based on the knowledge of mathematics, but also based on reality and involve all aspects of life. Therefore, the analysis and solutions of these problems needed various and comprehensive knowledge, so it required teachers to understand all aspects of knowledge. They formed a multilevel and diversified knowledge structure. The cultural foundation includes two core qualities: humanistic background and scientific spirit.
Humanistic background mainly referred to the basic abilities, emotional attitudes and value orientations formed by students in learning, understanding and applying the knowledge and skills of the humanities. It included the basic points such as cultural accumulations, humanistic feelings and aesthetic taste [2]. Mathematics teachers should master basic mathematical theories and professional knowledge. They also should master the contents of mathematical history, mathematical celebrities and other aspects. In this way, mathematics teachers could better grasped the theoretical backgrounds and structures of each mathematical knowledge point and recognized the inner connections between elementary mathematics and higher mathematics. Then teachers could explore and explain the middle school mathematical problems from a higher point of view. In this way, teachers could not only teach students mathematics knowledge in class, but also helped students to improve their aesthetic appreciation and promoted the formation of values.
Scientific spirit mainly referred to the value standard, modes of thinking and behaviors of students in learning, understanding and applying scientific knowledge and skills. It

included the basic points such as rational thought, critical questioning, exploring and so on [2]. With rational thinking as the foundation, human would not unconditionally accept authoritative conclusion, at the same time they also had the ability to criticize the existing conclusions and to explore its authenticity [4]. Therefore, it was not enough to teach the students existing knowledge, so mathematics teachers should train students' ability of rational thinking and teach students with a critical eye to see a problem. Teachers also should teach students don't blindly believe in any experience and authorities, they should encourage students to explore in the teaching.

2.2 Autonomous development

In modern teaching, teachers should have the consciousness of independent developments, they should recognize and discover themselves value and explore their potential. So they can effectively cope with the complex and changeable environment and develop themselves into a person with a clear direction of life. The autonomous development of teachers was the key to improve their professional competence. It also was an essential characteristic of a good teacher. The professional development of teachers enables them to have the motivation of continuous learning, professional enthusiasm, professional spirits and their own unique teaching thoughts. Therefore, teachers must have autonomous development consciousness. Autonomous development includes two core qualities: learning and healthy living.

Learning referred to the comprehensive performance of learning consciousness formation, learning method selection, learning process evaluation and regulation. It included the basic points such as enjoy learning, diligent reflection and information consciousness [2]. One of the qualities of good learners was the sign of "learning" [5]. Therefore, teachers should establish the concepts that students should "learn to learn". Teachers should realize that teaching requires students not only to master basic knowledge and skills, but also have independent thinking ability. At the same time, teachers should supervise students' learning ability, in order to avoid students' passive learning.

Healthy living referred to the comprehensive performance of self-knowledge, physical, mental development and planning of life. It includes basic essentials such as cherishing life, healthy personality and self-management [2]. Therefore, teachers should transform education concepts and set up an equal concept of teachers and students. Students' achievement is no longer the only evaluation criterion. Teachers generally evaluate students from many aspects.

2.3 Social participation

Teachers should emphasize their own social participation so as to deal with the relationship between themselves and society. People should develop the moral codes and the codes of conduct that modern citizens must observe and perform. They should enhance their own sense of social responsibility and constantly improve their innovative spirit and practical ability. In order to promote the realization of personal value and our social development, develop themselves into an ideal and courageous person, social participation also includes two core qualities: responsibility and practical innovation.

Responsibility referred to the emotional attitude, value orientation and behavior in dealing with social, national and international relationships. It included the basic points of social responsibility, national identity, international understanding and so on [2]. Responsibility plays as a guide of ideology and it is also a code of conduct. In order to cultivate the core quality of students' responsibility, it is necessary to train teachers' knowledge of responsibility and teaching organization.

Practice innovation referred to the practical ability, innovation consciousness and behavior performance formed in daily activities, problem solving and so on. It included labor consciousness, problem solving, technology application and other basic points [2]. Therefore, teachers should not only have professional knowledge and skills, but also have a strong sense of innovation, cooperation and practical ability, improving students' labor consciousness, problem solving ability and technical application ability.

3. Courses setting status and analysis of graduate students in mathematics education

Taking Shandong Normal University as an example, the full-time graduate students in education degree programs were divided into four categories: degree basic courses, professional compulsory courses, professional elective courses and practical teaching [6]. There are six basic degree courses: foreign language, political theory, educational principle, curriculum and teaching theory, educational research methods and psychological development and education. These courses have the same syllabus for all graduate students and have the same requirements. These courses were generally opened in the second semester, opening hours about 216 hours with a total credit of 12 credits. Professional compulsory courses generally opening in the first to second semester, it generally has five to six courses depending on the direction of the subject. The opening hours of these courses are about 200 to 300 hours with credits between 10 and 14. There are about six courses offered in different subjects. Each course normally takes about 2 credits and 36 hours. Practice teaching was divided into on-campus practice and off-campus practice. Off-campus practice was divided into educational observation, educational practice and educational institute. On-campus practice includes school training. School training includes micro-grid teaching, case studies and teaching skills training and so on. It generally opened in the first semester. Educational observation, educational practice and educational institute are in the third semester. The setting of mathematics teaching courses (Table 1) is as follows.

Table 1

Course Type	Course Title	Credit	Total Hours	Semester
Degree Basic Courses	Foreign Language	2	36	1
	Political Theory	2	36	1
	Educational Principle	2	36	1
	Curriculum and Teaching theory	2	36	1
	Educational Research Methods	2	36	2
	Psychological Development and Education	2	36	2
Professional Compulsory Courses	Mathematics Curriculum and Teaching Materials Research	2	36	1
	Mathematics Teaching Design and Implementation	2	36	2
	Basic Theory of Mathematics Learning	2	36	2
	Measurement and Evaluation of Mathematics Teaching	2	36	1
	Modern Educational Technology	2	36	2
Professional Elective Courses	Modern Mathematics and Middle School Mathematics	2	36	1
	Introduction to Mathematical Culture and History of Mathematics	2	36	2
	Middle School Math Classroom Basic Skills	2	36	2
	Mathematics Teaching Software and Application	2	36	2
	Mathematics Classroom Teaching Management Art	2	36	1
	Mathematics Curriculum Resources Development and Management	2	36	1
Practical Teaching	School Training	2	36	1
	Educational Observation	1	18	1
	Educational Practice	4	1 semester	3
	Educational Institute	1	18	3

Taking Shandong Normal University mathematics subject teaching as an example, in the two years study of graduate students in mathematics education, the theory and practice were combined. The theoretical courses are all centered on mathematics teaching, mathematics courses and mathematics culture and so on. The practice teaching also helps students to understand and apply these theories. The setting of courses is beneficial to the overall development of students. It can also help students develop their own quality. Although in the setting of professional courses involves a large number of mathematical contents. However, the practice of these specialized courses has not been implemented, but only limited to the theoretical discussion. In the arrangements of education masters' courses, the first year is theoretical course and the second year is practical course. The courses were concentrated, but some professional courses should be put into practice immediately after the end of the course. This will help students get the best results. In addition, the setting of professional courses is comprehensive, but it is not enough for the training of students' core quality. Many courses only involve some superficial contents, but there is no in-depth discussion and research on the course itself. Therefore, some professional courses teaching cannot achieve the desired results.

4. The curriculum reform and exploration of graduate students in mathematics education based on core quality

Based on the analysis of the core quality and graduate students' curriculum, we believed that in order to implement the core quality's training goal, the current curriculum of graduate students in mathematics education should do the following reform.

4.1 Enriching the content of the course and breaking the boundaries of discipline

Although the current graduate students' elective course had mathematics culture and mathematics history introduction and other subjects, this is not enough to cultivate students' core quality. Only graduate students in education have sufficient humanistic background, so it was possible to cultivate students' humanistic background after becoming a teacher in the future [7]. Therefore, the course of graduate students in education should add interdisciplinary courses, break disciplinary boundaries, improve students' overall quality and play down the disciplinary tendency. For example, science graduate students' course can add some humanities and arts courses; Liberal arts graduate students' course can add some natural science courses. Graduate students in art education should also learn some subjects that can improve students' rational thinking ability and make students have critical thinking. In addition, the course content of graduate students in education should be more close to life, focus on openness and expand students' thinking horizons.

4.2 Targeted practice in the course of implementation

In the two-year course of graduate students in education, the first year is mainly based on theory, and the second year is generally based on practice. Among them, theoretical courses such as mathematics teaching measurement and evaluation, mathematics teaching design and implementation are very important. If in the first year, curriculum designer only focuses on the theoretical basis and does not pay attention to the practice, it cannot achieve the best teaching effect by relying on the practice teaching in the second year, nor can strengthen the graduate students' awareness of the independent development. On the contrary, Curriculum designer can focus on practice in the teaching process of such courses, let education master timely apply theoretical knowledge to practice. On the one hand, it can enhance the teaching effect, on the other hand, it can make graduate students in education realize the importance of learning, and be good at managing itself effectively in learning. In the

second year of practice teaching, graduate students in education mainly focus on lectures, while the observation, interaction, in-depth exchange and research of primary and secondary students are less. Some graduate students in education focus on improve their teaching skills, don't attach importance to the communication with students, this cannot reach to the standards that achieve to cultivate students core quality. In class and after class, graduate students in education should fully understand students, excavate students' psychological, realize student's thought. Only in this way, can they catch at the root of the problem, and find the most effective way that cultivate the students' core quality [8].

4.3 In the course evaluation, combining theory with practice content, attention to process evaluation

First of all, the course evaluation content of graduate students in mathematics education should combine theory with practice content. In theory, On the basis of examining students' understanding and memory of what they have learned, to investigate whether students can apply theory and practical teaching. As for the study of practical teaching, we should pay more attention to the theoretical achievements of graduate students in education in practice. To cultivate students' core qualities, teachers should not only have the relevant theoretical foundation of core accomplishment, but also have the belief and ability to cultivate students' core qualities. The principle of combining theory with practice was embodied in the course evaluation, and the dual training goal of education master was realized [9].

Second, cultivating students' core quality was a long process, and the earlier the implementation was more conducive to the development of students. Therefore, the evaluation of this education target should also be reflected in the process [10]. Graduate students' courses tended to use an end-of-life evaluation model, which was only conducted after each course. We could change the evaluation model, establish the process evaluation system, and make the evaluation realize in the learning process.

5. Conclusions

To cultivate the core quality of middle school students is the newest requirements of Chinese education reform. In order to meet this requirement, the current courses of graduate students in mathematics education master should be further reformed. It could not only introduce the fundamental teaching knowledge and skills but also absorb related knowledge and content of contiguous disciplines. It not only helps the students to do regular training but also give students more particular guides based on the content and standards of core quality. It not only insist on the former assessment method and ways but also reform some of them to highlight the assessment of core quality, etc. Only doing as these, the graduate students could fit for the future teaching works and prompt the accomplishment of the teaching purpose of core quality.

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