

Research on the Training Mode of Master of Education in Mathematics

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Abstract

The establishment of the professional degree of master of education has opened up a channel for Chinese primary and secondary school teachers to obtain graduate degrees. It has developed extremely rapidly since the official enrollment, and it has become an important part of degree and graduate education in China. It has trained a large number of backbone teachers and excellent managers for basic education in China. Although the development of master of education in China shows a good development trend, due to the large number of people involved in basic education, the cultivation of master of education in China is still in a period of continuous construction, which does not fully meet the actual needs in terms of quantity and quality. Therefore, professional master education is still hovering at the door of possibility research and feasibility exploration, and it is difficult for master of education to enter the operable practice hall of basic education to show their skills. Thus, the society questions the applicability of master of education more or less. In order to cultivate the professional master of mathematics better, it is necessary to implement a comprehensive reform of the talent training program for the graduate students of mathematics major, and establish a joint training mechanism for the graduate students of mathematics education from three aspects: colleges and universities (Foshan University), local education bureau, and primary and secondary schools. Based on the above reasons, this paper will carry out further research on the talent training mode of master of mathematics education in our college, and strive to make a breakthrough. A number of theoretical and practical achievements in the cultivation of master of mathematics education talents in local universities have been formed to provide reference for the construction of professional and master education system in Guangdong and China.

Keywords

Mathematics, Training mode, Master of education, Tripartite collaboration

1. Introduction

Since 1993, in combination with the actual situation of our country, the office of the Academic Degrees Committee of the State Council has begun to carry out the investigation and demonstration of the establishment of the professional degree of master of education, including holding an expert seminar on the establishment of the professional degree of master of education, and entrusting experts in the field of education to study and formulate the training plan and implementation plan of master of education graduates. In 1996, the Academic Degrees Committee of the State Council passed the report on setting up and pilot running the professional degree of master of education, which began the cultivation of master of education, and master of education came into being. In 1997, 16 normal universities including Bei-

ing Normal University, East China Normal University and central China Normal University were approved to pilot master of education majors. In 1998, 13 normal universities including capital Normal University, Shanghai Normal University and Henan Normal University were approved to start master of education majors. So far, the training institutions of master of education in China are not only limited to normal universities, but also some comprehensive universities with strong comprehensive strength have begun to offer master of education majors, such as Fudan University, Ocean University of China, etc. In addition, there are many colleges and universities without normal education background are also actively applying for master of education, and the scale of master of education in China is gradually expanding. The establishment of the professional degree of master of education has opened up a channel for Chinese primary and secondary school teachers to obtain graduate degrees. It has developed extremely rapidly since the official enrollment, and has become an important part of degree and graduate education in China. It has trained a large number of backbone teachers and excellent managers for basic education in China (Research group of graduate education quality assurance system, 2021) and (Xiaowen Zhu, 2018).

Foshan University obtained a master's degree in discipline education in March 2014 (including 7 disciplines such as education management, mathematics, Chinese, physics, English, ideological and political education and modern education management), and began enrollment in December 2014. With the expansion of the educational scale of master of education, there are still many imperfections in the teaching methods, training mode, curriculum, teacher team construction, quality assurance system and other aspects of master of education. The postgraduate talent training mode has attracted the common attention of the government, primary and secondary schools and colleges. Reviewing the development process of the master of mathematics education in our college in the past eight years, we should rationally view and study the existing problems of the master of mathematics education major. In order to better cultivate the professional master of mathematics, it is necessary to implement a comprehensive reform of the talent training program for the graduate students of mathematics major, and establish a joint training mechanism for the graduate students of mathematics education from three aspects: colleges and universities (Foshan University), local education bureau, and primary and secondary schools in Guangfo region. In terms of talent training plan, curriculum setting, teaching reform, practice base construction, student practice links, graduation thesis, graduation assignment, enrollment publicity and other aspects, we will jointly formulate plans and implement them, so that the students we train meet the actual needs of the society. Implement the concept of joint postgraduate training of "cooperative training, multiple management, and resource (achievement) sharing", and ensure that education bureaus at all levels in the urban area and relevant primary and secondary schools participate in the formulation of training plans, the selection of tutors, and the management and implementation of teaching; Co construction and other daily affairs provide a strong guarantee in the provision of student demand information, the construction of practice bases, the design of practical teaching links, the promotion of project topics, the development of action research, the recommendation of part-time tutors and the co construction of disciplines. It has important theoretical and practical significance for improving the talent training mode of master of mathematics education, improving the quality of master of education training, and improving the level of basic education in this region (ZhanjunWang, 2021).

2. Review of research status in China and abroad

2.1 Research status abroad

Since Harvard University President Conant (J. B.) set up the first master of education degree in human history in 1936, the Western Master of education has a history of more than 80 years. It has achieved remarkable success in theoretical exploration, construction and training, practical operation, management evaluation and other aspects, and formed a set of theories and systems in teaching, training and management, forming unique characteristics, The forward-looking thinking and construction aftereffects triggered by the five major fields (degree characterization, goal orientation, enrollment threshold, curriculum, training methods, etc.) provide a reference path for the cultivation of professional education masters in China. Taking the cultivation of master of professional education in major western countries such as the United States, Britain and Canada as an example, its cultivation experience under the flexible system can be summarized as: qualitative application-oriented degree, basic goal orientation, tolerant enrollment threshold, compound curriculum, vocational training methods, etc., which has unique reference significance for the discussion of the cultivation mode of master of professional education talents (JiongShen, Jianming Feng, et al., 2018).

The goal construction of Western professional education masters fully reflects learning, learning is reflective learning, and learning is experiential learning. Cultivate three kinds of people around three goals and make them form three abilities. Its training target orientation includes object orientation, characteristic orientation and development orientation; The object orientation determines the training goal of teaching, pointing to the on-the-job personnel with certain expe-

rience in educational management and teaching practice; Characteristic orientation requires teachers to be good at inspiring students to use new thinking to solve stubborn problems and emerging new problems in education and teaching; Its development orientation requires that degree education and teaching must adhere to creative work practice under the guidance of theory, cultivate educational administrative officials who have the cognitive ability of humanistic education, understand educational laws and have scientific decision-making power, educational managers who have scientific management ability and the implementation of policies and regulations, and front-line backbone teachers who have compatible and innovative teaching action ability and lead the discipline direction. Through the formulation of training objectives to promote the progressive development of professional education master training (Xiangyang Liao, 2022).

The specialty of Western Master of education aims at employment and good business. Through compulsory courses, it reflects the collectivity of knowledge inheritance and strengthens the longitude of knowledge; Through elective courses to sharpen the divergence of thinking and broaden the latitude of knowledge. The curriculum is set up around "seeking knowledge, practicing methods, practicing and thinking". Its professional degree is set up in the name of projects, and there are multiple directions under each project. For example, the direction of general education is mainly carried out around educational management, curriculum design, subject teaching, educational technology, teaching research and educational psychological research, and forms a chain discipline teaching group. The process of instructional design and implementation is to establish excellence.

Potential and the process of refining characteristics. Curriculum design embodies the characteristics of complexity, that is, to highlight the leading nature of core disciplines, the intersection of marginal disciplines, and the diversity of derived disciplines; Establish the corresponding relationship between learners, teaching (Education) scholars, teaching researchers and curriculum, and pay attention to the "Trinity" role participation in curriculum learning; It emphasizes experiential learning based on textbooks and knowledge expansion, applied research based on learning methods and teaching method exploration, and organically combines the application of educational technology with teaching innovation; Through the course learning of credit system, we can form the basic research ability of education and teaching, the transformation ability of basic theory and practice, and the ability of education and teaching.

Dynamic ability and technology application ability based on resource integration. The cultivation of master of professional education in western universities reflects professionalism, and its cultivation method is based on the market positioning of master of professional education and the aftereffect of students' employment. Its contents include time system, length of study, composition of tutors, learning (guidance) methods, etc. The training time system includes one-year full-time, two to three-year part-time and some professional distance education. However, there are certain norms or restrictions on the master's training of part-time system. For example, the number of annual courses is generally no more than four, the duration of study is no less than two years and no more than six years, and the cumulative time of both weekend and night study and specified holiday study is calculated. The training of master of professional education is jointly carried out by consultants, mentors and group mentors.

However, since the 1980s, due to the low quality of the traditional master of education program, the United States has begun the reform of master of education training program. This reform takes the National Board for professional teaching standards (hereinafter referred to as NBPTS) and evaluation methods as the guiding framework. The five core propositions put forward by NBPTS have become the basis for developing evaluation standards and evaluating excellent teachers. These five propositions are: (1) teachers are responsible for students and their learning; (2) Teachers are familiar with the contents of the subjects taught and know how to teach them to students; (3) Teachers have the responsibility to manage and organize students' learning; (4) Teachers can systematically think about educational practice and learn from experience; (5) Teachers are members of the learning community. Connected with these five standards is an open and credible evaluation process, which consists of two parts: the portfolio and the training of the evaluation center. The purpose of designing the portfolio is to obtain real-time and on-the-spot teaching materials, and then let the evaluator check how the teacher transforms knowledge and theory into practice. In the training of the evaluation center, teachers should answer some questions related to their teaching subjects. These questions are designed to verify that the knowledge and skills displayed in the portfolio accurately reflect what teachers know and can, and give teachers the opportunity to show them. In the evaluation process of NBPTS, teachers are reflective participants, that is, they describe, analyze and reflect on classroom practice every day, and use this information to improve and adjust future teaching practice, which is regarded as an experience process of professional development. Therefore, the standards and evaluation methods of NBPTS have naturally become the guiding framework for the reform of master of education training in many colleges and universities. The experience and practice of the United States can be used for reference for the reform of master of education training mode.

2.2 Domestic research status

Over the past 40 years of reform and opening up, with China's political and economic reform and the improvement of the higher education system, China's graduate education has achieved unprecedented development (Zhanjun Wang, 2018). The research on the education of professional master's degree has also achieved some results. The compilation of working materials for professional master's degree of Education (a total of three volumes) compiled by the Secretariat of the National Steering Committee for professional master's degree of education has put forward reform and Guidance Opinions on the significance of the establishment and development of professional master's degree of education, the details of the implementation and implementation of educational practice, and the problems and Countermeasures Existing in the implementation process, We have a clear understanding of the nature, training objectives, enrollment, curriculum and teaching staff of the professional degree of master of education.

Liang Jinghe and Qi Junhua, editor in chief of the "Research on the training mode of master of education", discussed the problem of master of education; Liu Jianyin's "policy thinking on the diversification of the cultivation mode of master of education in China" and Zhang Xiaoming and he yanru's "thinking and practice of the cultivation mode of master of education" studied the cultivation mode of master of education; Yang Mingquan, Shi Hualing and Wang Yanling's "investigation and Research on the curriculum setting of professional degree education for master of education in China", Li Zhangquan and Wang hongsong's "highlighting the characteristics of professional degree and optimizing the curriculum setting of master of education", and Wang Xiuzhen's "new curriculum reform and the curriculum setting of master of education" have summarized the current curriculum setting plan of master of education in China; Duan Lihua, Chen Xuyuan and Zhou Lin's "exploratory research on the teaching methods of master of education graduates", Professor Yang Qiliang's "problems and explanations in the practice of master of education professional degree education", shaoguanghua and Yao Jing's "Research on the teaching reform of master of education professional courses" Wu Haishun and Wei Canjin studied the teaching methods of Cultivating Master of education from different aspects.

Although the development of master of education in China shows a good development trend, due to the large number of people involved in basic education, the cultivation of master of education in China is still in a period of continuous construction, which does not fully meet the actual needs in terms of quantity and quality. The difference between quality requirements and practical needs highlights the inaccurate positioning of the training objectives of master of Education: the training of master of education in China is the follow-up development of undergraduate normal education in the reform, and undergraduate education is the training of wide caliber and thick foundation to adapt to the diversity of employment environment; The construction of master of education degree should be the output process of training professionals, but the expression of "training high-level professionals engaged in the teaching and management of basic education" in its training objectives appears broad, vague and uncertain, especially the expression of "high-level" can not be used as the quality basis of talent training; Secondly, teachers' lack of experience in basic education to a considerable extent leads to vague and biased understanding, mistaking master of education as a degraded training of academic masters, and the helpless psychological positioning of tutors affects the quality and aftereffect of master of education training; After the classification and characterization of academic master's and professional master's degrees, the "de academic" also brings a vague understanding of partial generalization, so that many people equate "de academic" with "de research". Therefore, low-level and repeated training at the undergraduate stage has become a phenomenon.

The curriculum of master of education training in China is divided into degree courses and non degree courses. Degree courses include public degree courses of educational thought theory and general scientific research methods, and professional degree courses of related basic teaching theories and discipline teaching and research methods; Non degree courses include public elective courses and professional elective courses. Professional elective courses cover the exploration of the combination of theory and practice of subject teaching, the analysis of teaching and learning situation of subject teaching, the inheritance and innovation of subject teaching, the language analysis and learning method discussion of subject system, the analysis of subject course textbooks and the application of teaching methods, and the application of skills and skills in subject teaching. As the curriculum follows the basic idea of academic degree curriculum, the curriculum of professional masters cannot be fundamentally distinguished from academic degree curriculum; The single knowledge composition of the teachers' team and the rigidity of preconceived ideas have led to a large proportion of ideological principle courses in the curriculum structure, unprofessional professional courses, thin practical courses, lack of continuity and in-depth expansion of the curriculum, and the research elements contained in the curriculum are greater than practical application elements.

Therefore, professional master education is still hovering at the door of possibility research and feasibility exploration, and it is difficult for master of education to enter the operable practice hall of basic education to show their skills.

Therefore, the society questions the applicability of master of education more or less. The training method of master of professional education in China mainly focuses on course learning, and also focuses on Thesis Writing (or research reports, investigation reports, and teaching design). The course learning adopts the credit system. Teachers and tutors use the combination of teaching, self-study, and discussion, and strengthen master students' learning of basic theories and expertise of subject teaching or education management through case teaching, Improve their ability to solve practical teaching problems; In terms of thesis guidance, the method of combining the responsibility of the tutor with the collective training of the tutor group is adopted to organize the opening of the thesis, the mid-term supervision and inspection, the examination and evaluation of the results, the submission and defense of the thesis, etc. the tutor or the tutor group is fully responsible for the ideological and professional growth of the master, and gives timely consultation, guidance and life care. However, this seemingly reasonable way often faces the dilemma of inborn deficiencies. The tutor lacks understanding and research of basic education, does not personally participate in primary and secondary school teaching practice, cannot understand the essence of basic education curriculum reform, case teaching lacks the strong support of resource base and own experience, lacks teaching methods and learning guidance compatible with innovative significance, and teaching is divorced from reality due to insufficient ability, wandering on the edge of academic degree education and applied degree education, it is difficult to ensure the training of applied talents urgently needed in primary and secondary schools.

3. Research objectives, contents and solutions

3.1 Research objectives

The research objectives of this paper are: (1) to study the current situation of the training mode of master of mathematics education in China; Comparing the new trends of postgraduate training and quality assurance system of master of education in the United States, Britain and other countries, this paper points out the problems of postgraduate training mode of master of mathematics education in our college and analyzes the reasons; (2) Establish perfect talent training objectives; (3) Establish a joint postgraduate training mode of "cooperative training, multiple management, and resource (achievement) sharing" among colleges and universities, education bureaus, and primary and secondary schools.

3.2 Research content

Perfect talent training objectives that closely follow social needs: investigate employers, study social needs, adjust talent training objectives, and make students better adapt to social needs and challenges. In combination with local characteristics, improving talent training objectives should also have Guangdong characteristics.

Explore the training program of master of mathematics education with local college characteristics: actively explore three training modes: Interactive Teaching - special lectures - demonstration and observation - case discussion mixed teaching mode; The practical ability training mode of combining platform studio with post (top post); Task - Project - topic - graduation design docking of scientific research ability training mode. The curriculum design should be further strengthened, and the curriculum should highlight practical application.

Establish a community of teachers for Teacher Education: the school integrates and optimizes teacher resources, increases the introduction of talents, and provides sufficient teachers for teacher education courses. Employ excellent educators and highly skilled talents from primary and secondary schools, teaching and research institutions, enterprises and institutions, and educational administrative departments to serve as part-time teachers in Colleges and universities. Cultivate a number of "doctoral + Professor + middle school teacher" mathematics education teachers who are good at teaching and doing, and have a certain disciplinary vision and humanistic quality, which are needed for the development of mathematics education in Guangdong.

Carry out the construction of excellent teaching team: first, carry out the construction and reform of specialty and curriculum system. Second, plan and organize the reform of teaching content, teaching methods and means, strengthen the combination of scientific research and teaching, and explore research-based teaching. Third, plan the construction of experiments and practical teaching, organize and guide students to participate in scientific research practice, independent innovation activities and discipline competitions. Fourth, implement the training and echelon construction of teachers, improve the overall level of teachers, and cultivate famous teachers at all levels and "double qualified" teachers. Fifth, carry out teaching research and cultivate teaching achievements.

Strengthening curriculum construction: curriculum construction is an important starting point for the training quality of master of mathematics education. Talent training objectives, professional training objectives, and the training of students' practical ability and comprehensive quality depend on the scientific design of each course and class of teachers. Classroom teaching should change from "knowledge imparting" to "ability training". "Tripartite collaboration" high-

lights practical links and forms its own characteristics. In terms of curriculum setting, combined with the actual education and teaching of local primary and secondary schools, digital education and digital campus, local mathematics problem research and other courses are offered. Foshan has done a good job in informatization, so courses such as smart Foshan and information technology application can be offered; At the same time, we will carry out high-quality resource sharing courses and plan the construction of teaching materials. Curriculum teaching reform must redesign and rearrange the teaching content, and highlight the cultivation of students' quality and ability. Implement diversified assessment and evaluation mechanisms to mobilize students' enthusiasm for self-study.

Carry out the practical teaching of "tripartite cooperation": run the practical teaching through the whole process of training, set goals in sections, and ensure the practical results. Establish a stable educational practice base and a mechanism to ensure the funding of educational practice. To strengthen the construction of the postgraduate demonstration base, the university should jointly build and train the postgraduate demonstration base of master of mathematics degree with Foshan Municipal Education Bureau, five District Education Bureau, Foshan No.1 middle school, Nanhai Experimental Middle School and other employers, and employ experienced senior middle school teachers as part-time instructors to guide the Postgraduate students to carry out practical activities such as teaching practice, educational probation, educational investigation and so on. Build a number of high-level internship and training bases for master of mathematics education.

3.3 Solutions for main problems

First, in-depth study of the education master training and quality assurance system in the United States, Britain and other countries, and analyze the reference and Enlightenment to the Education Master Training of our college. This paper analyzes the problems in the training mode of postgraduate students of master of mathematics education in local colleges and universities in China, and studies its influencing factors.

Second, improve and optimize the training mode of the master of mathematics education in our college, construct the "tripartite cooperation" training mode of the master of mathematics education in our college, and put forward the quality assurance system for the realization of the mode.

Third, theoretical summary and practical research on the "tripartite collaboration" training mode. The mathematics major has jointly cultivated more than 10 graduate students with South China Normal University and South China University of technology. At the same time, it has also cooperated with 6 education bureaus, including Foshan Education Bureau, Chancheng District Education Bureau, Nanhai District Education Bureau, Shunde District Education Bureau, Sanshui District Education Bureau, Gaoming District Education Bureau, Foshan Institute of Education Science, Foshan information network middle school, Foshan No.1 middle school, Nanhai middle school, Nanzhuang No.3 middle school, Nanhai Experimental Middle School And other famous universities in Guangdong have jointly established joint training bases, employing more than 30 senior and senior teachers of mathematics in these famous universities as off campus instructors to guide graduate students and undergraduate students in teaching practice, educational internship, educational investigation and other practical activities. How to effectively use the existing social resources, give full play to the advantages of social resources, and explore the integration of teaching and research is the focus of our attention.

4. Conclusions

The overall design of the master of professional education curriculum reflects the integration and collision of Chinese and Western ideas, and has the structural characteristics of compounding, cutting-edge, flexibility and school-based. However, its receptive integration is greater than critical collision, resulting in the curriculum can not meet the practical needs. It is necessary to carry out Chinese Thinking on the existing curriculum design: study through common compulsory courses (ideological methods); Through professional compulsory courses (professional quality); Through the center elective courses (action ability); Cultivate wisdom through marginal elective courses (management wisdom, thinking methods, cutting-edge thinking). The curriculum design of compulsory courses reflects the theoretical nature of general courses and the professionalism of degree professional courses, and professional elective courses reflect the practicality of skills and the expanded relevance of public elective courses. The curriculum design is scientifically classified and implemented step by step to avoid low-level repetition of courses similar to undergraduate courses, improve the level and level of curriculum setting, and lay a curriculum platform for cultivating qualified applied talents.

However, the postgraduate education and training system is still not perfect since our college first recruited master's students majoring in Mathematics in 2014. For example, the characteristics of the talent training plan are not prominent enough, and it should be further strengthened from the local and applied aspects. The training program should be career oriented, and realize the docking of training objectives and local education needs, curriculum and teacher post requirements, classroom teaching and on-the-job (on-the-job) practice, graduation topics and educational research topics.

The training mode is not quite reasonable, and the training mode should implement the combination of school politics, learning and research. In order to cultivate and improve the comprehensive practical ability and the ability to analyze and solve practical problems of primary and secondary school mathematics teachers, we should actively explore a talent training mode that meets the needs of society. The curriculum design should be further strengthened, and the curriculum should highlight practical application. Courses with modern ideas and information technology research should be offered in combination with the reality of primary and secondary education and teaching in Guangfo area. The construction of the postgraduate demonstration base needs to be strengthened. The school should jointly build and train the postgraduate demonstration base of master of mathematics with education bureaus at all levels and local primary and secondary schools, hire experienced senior teachers as part-time tutors, and guide graduate students to carry out practical activities such as teaching practice, educational probation, educational investigation, etc. At the same time, further reforms are needed in the teaching staff, teaching methods, teaching resources and other aspects, so as to provide guarantee for the training of high-quality mathematics teachers in primary and secondary schools in Guangfo area.

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