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The Research on Mathematics Microteaching in China

Zezhong Yang*, Miaomiao Zhang

The School of Mathematics and Statistics, Shandong Normal University, Jinan, China

Abstract

As a teaching mode that combines theory and practice organically, Mathematics Microteaching is an important method for training mathematics teaching skills. In recent years, there has been a series of academic researches on the Mathematics Microteaching. This article reviews and sorts out the researches on Mathematics Microteaching, and draws the following conclusions: (1) The previous researches on Microteaching mainly focus on three aspects: the overview of Mathematics Microteaching, the shortcomings of Mathematics Microteaching and the improvement measures of Mathematics Microteaching. (2) Previous studies systematically analyze the problems and improvement measures of Mathematics Microteaching, but there are also shortcomings of strong subjectivity. (3) In the previous researches, there are still shortcomings of single research methods and lack of empirical research, and there are gaps in how to classify mathematical skills so as to meet the characteristics of the subject and facilitate Microtraining. Therefore, it is necessary to improve the research methods in the future and conduct research from a broader perspective in order to improve the research on Mathematics Microteaching.

Keywords

Mathematics, Microteaching, Teaching Skills

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1. Introduction

Under the current reform of the new curriculum of mathematics education, higher and higher requirements are put forward for the professional ability and teaching skills of mathematics teachers. Therefore, it is necessary to train mathematics teachers' teaching skills. As a teaching mode that combines theory and practice organically, Mathematics Microteaching is an important method for training mathematics teaching skills [1-2]. Therefore, in the face of the advancement of the new mathematics curriculum reform and the professional development of teachers, it is very important to study Mathematics Microteaching. In recent years, Mathematics Microteaching has begun to enter the field of mathematics teacher education, and there have been a series of academic studies on Mathematics Microteaching, but there is no general research on Mathematics Microteaching. In order to ascertain the current research status, research deficiencies and gaps that have never been involved in the previous researches on Mathematics Microteaching, this article intends to make an overall summary of previous researches. This research can not only provide ideas and directions for the implementation and improvement of Mathematics Microteaching, but more importantly, it can help researchers grasp the characteristics and status quo of current research, point out its shortcomings and gaps, so as to promote the further research of scholars.

2. Methods

2.1. Source of Data

This article adopts the literature method and uses the documents in the China National Knowledge Infrastructure (CNKI) as the data source. CNKI is the most authoritative

* Corresponding author
E-mail address: zhongzee@163.com (Zezhong Yang)

document retrieval tool for national academic journals, which basically includes all the contents of journals in China. This paper chooses this database to ensure the persuasiveness and reliability of the research.

2.2. Data Collection

With "mathematics" and "Mathematics Microteaching" as the search term and "subject" as the search item, 72 articles are retrieved according to the ascending order of publication time. This paper studies mathematics microteaching, selects 35 references, and finally selects 21 references considering the research problems and the number of references cited.

2.3. Data Collation

In the process of Intensive reading of literature, we can summarize and sort out the research problems and results of the past researches by the method of taking notes.

3. Results

Through reviewing and sorting out, it is found that the predecessors mainly study from three aspects: the overview of Mathematics Microteaching, the shortcomings of Mathematics Microteaching and the improvement measures of Mathematics Microteaching.

3.1. The Overview of Mathematics Microteaching

3.1.1. The Connotation of Mathematics Microteaching

Chen and Hu point out that Microteaching is a scientific teaching method based on modern educational theory, using modern audio-visual equipment (cameras, video recorders, etc.) to systematically train teaching skills [3]. Jin points out that Mathematics Microteaching is a method of systematically training mathematics teaching skills based on the basic principles of Microteaching under the guidance of modern mathematics education theories and science thoughts. The essential feature of Mathematics Microteaching is to follow the law of mathematics teaching, strengthen the training of various mathematical teaching skills, so as to achieve a breakthrough in the traditional skills training method [4].

3.1.2. The Characteristics of Mathematics Microteaching

Wang, Hu, Tan, Luan and others point out that Mathematics Microteaching has the following characteristics: First, the training goal is clear and maneuverable. In the Microteaching mode, the teaching content is broken down into individual teaching skills, and a lesson is often uesd to train a certain type of skill, so that the training of each skill is detailed, specific, and highly operable. Second, the feedback is timely and evaluable. Teachers can quickly collect evaluation, timely receive valuable information, so as to promote students to constantly improve. Third, Mathematics Microteaching can perform quantitative analysis and is measurable. Teachers should record and evaluate every change of teaching skills of each student, conduct analysis and evaluation, quantify them according to a certain proportion, and record the evaluation results of teaching skills after Microteaching training. Fourth, Mathematics Microteaching is controllable; Fifth, the audiovisual equipment is used in teaching, with highly intuitive. Sixth, the training process saves time. The time for each lesson is very short, usually within 10-20 minutes. Seventh, the number of Microteaching groups members is small. Generally, there are only 5-6 students in a group, ensuring that each student has ample opportunity to get training and individual counseling. Eighth, the psychological burden of students is small, which can reduce the tension of trainees. Ninth, Microteaching is repeatable. Through video feedback and group evaluation, trainees can easily find their own shortcomings [5-7].

3.1.3. Implementation Steps of Mathematics Microteaching

Hu, Gong and others point out that Mathematics Microteaching is targeted at normal students and the start time is before the educational practice. The course time is at least 48 hours, and it can be offered in conjunction with other related courses. The implementation of this course is generally divided into the stages of theoretical study, student practice, teacher-student feedback evaluation, and deciding whether students need to practice again according to the specific situation [8-9].

Xie, Wang, Liu, Zhao, Wang and others point out that the implementation of Mathematics Microteaching is divided into six steps: First, studying and researching in advance. The learning contents mainly include basic courses of mathematics, teaching design, classification of teaching objectives, analysis of teaching materials, classification of teaching skills, teaching evaluation and others. Second, determining the teaching skills to be trained. The teaching skills are divided into single teaching skills, and they are trained separately. Only one or two skills are trained at a time. Third, watching the Microteaching demonstration video. Before training, we usually use text materials, watching videos and other methods to observe and learn the skills to be trained. Fourth, designing and writing teaching plan. According to the determined teaching skills, the trainees will choose the appropriate teaching content, set the teaching objectives, design and write the teaching plan. Fifth, carrying

out practical teaching activities. According to the principle of heterogeneity within the group and homogeneity between groups, the whole class is divided into 5-10 training groups. One student plays the role of teacher and gives lectures on stage, while the others plays the role of student to cooperate with classroom teaching. The trainees use some teaching skills to simulate teaching, and the training time is generally about 10 minutes. The actual teaching situation of the micro class is recorded by camera system and other equipments, and is organized and guided by a instructor. Sixth, immediate feedback and evaluation. After Microteaching, the teacher replays the video and observes the trainees' degree of reaching the training goal; The trainees conduct self analysis to check whether they have mastered the teaching skills in the teaching process; Students, evaluators and instructors evaluate the problems in practice from their own perspectives; According to the problems pointed out in the self analysis and discussion evaluation, the trainees revise the teaching plan and enter into recycling [10-14].

3.2. The Shortcomings in Mathematics Microteaching

Ma, Wang, Zhang, Fu and others point out that there are the following deficiencies in Mathematics Microteaching: First, there is a lack of theoretical research on Mathematics Microteaching. Front-line teachers seldomly pay attention to the applicatoin of Mathematics Microteaching theory, while teachers who are keen on theoretical research often lack practical opportunities, which leads to the disconnection between theory and practice. Second, Mathematics Microteaching equipment is deficient. The number of laboratories is generally small, and the equipment is relatively old. Third, Mathematics Microteaching curriculum resources are insufficient. The teaching materials of Mathematics Microteaching are not rich enough, and there are no systematic Microteaching curriculum resources and excellent Microteaching videos. Fourth, Mathematics Microteaching period is insufficient. In China, 1+2 mode is generally adopted in Microteaching, that is, 16 hours of theory class + 36 hours of practice class. Fifth, Mathematics Microteaching curriculum arrangement is improper. The late opening of Mathematics Microteaching course makes the Microteaching training time less; Mathematics Microteaching course is opened early, students lack of the necessary theoretical basis and practical experience. Sixth, the limitations of simulation classroom. There are 5-10 students in Mathematics Microteaching classroom, and the actors of students and teachers are very familiar classmates of the same age and the same level of knowledge, which are quite different from the real classroom. Seventh, Mathematics Microteaching teachers are lacking. First of all, Many Mathematics Microteaching teachers have not received systematic professional training in Microteaching. Secondly, teachers often train students in one or two classes at the same time in Microteaching training, and may ignore the guidance of individual students; Eighth, students do not pay enough attention to Mathematics Microteaching. There are some problems, such as not understanding the theory and requirements of Mathematics Microteaching, searching for teaching plans on the Internet, and not paying attention to feedback and evaluation. Ninth, The evaluation system of teaching skill is not perfect. First of all, there is only a macroscopic evaluation framework, without subdividing the evaluation of various teaching skills, which is not targeted; secondly, it emphasizes subjective qualitative evaluation and ignores objective quantitative evaluation. Thirdly, it pays attention to teacher evaluation and mutual evaluation and neglectes self-evaluation. Finally, there is a lack of ability evaluation with the characteristics of mathematics, such as drawing ability, fast calculation ability and so on [15-17].

3.3. The Improvement Measures of Mathematics Microteaching

Zhang, Zhan, Tan, Fu and others point out that Mathematics Microteaching has the following improvement measures: First, deepening the theoretical research of Mathematics Microteaching. In order to give full play to the effectiveness of Microteaching, teachers of Mathematics Microteaching should change their learning and teaching views, and reintegrate the content, purpose, function, characteristics and methods of Mathematics Microteaching. Second, increasing the input of Microteaching equipment. Schools should build a web-based Microteaching system to better solve the problem of insufficient Microteaching classrooms and low utilization rate. Third, strengthening the construction of Mathematics Microteaching curriculum resources. First of all, schools should establish a video database of teaching case, make full use of modern information and communication technology, and deeply tap internal resources; secondly, schools should develop Mathematics Microteaching materials. It adopts the way of professional union and complementary cooperation, and draws lessons from the experience of excellent mathematics teachers and the theoretical guidance and case materials of mathematics teaching methods. Fourth, increasing the class hours of Mathematics Microteaching. Microteaching is set as a compulsory course for teacher education, which can increase the teaching time of students each time, so that students can complete the content of a course and experience the teaching links of lesson preparation, guidance, new lesson teaching, example explanation, class summary and so on. Fifth, combining Microtraining with educational practice. Microteaching is carried out before and after the educational probation. Through contrast, a better teaching scheme is put

forward; Sixth, improving the quality of Mathematics Microteaching teachers. Teachers should constantly strengthen learning, colleges should strengthen the links between institutions and cooperate with other colleges. And teachers should deal with the relationship between the whole and the parts. Under the premise of strictly requiring students to practice every skill, it is important to train students' ability to combine and master each skill flexibly [18-19].

Regarding the improvement of Mathematics Microteaching evaluation system. Hu, Miao and others point out that a diversified evaluation method should be adopted that pays attention to process and student development. First of all, teacher evaluation includes three aspects: students' performance, students' teaching situation and final examination. Secondly, student evaluation includes two aspects: intra-group mutual evaluation and student self-evaluation. Finally, we can also improve the evaluation of this course by issuing "mathematics teaching ability questionnaire" and referring to the situation of educational practice [20]. Chen, Meng and others point out that a scientific evaluation index system should be established according to the characteristics of mathematics majors and the evaluation objects. The evaluators should determine the index weight and design the evaluation system of Mathematics Microteaching by analyzing the interview scoring table of teachers qualification examination, the scoring table of basic skills competition for normal students, and the evaluation table of teacher recruitment in surrounding cities [21].

4. Discussion

To sum up, it can be seen that the previous researches on Mathematics Microteaching mainly focus on three aspects: the overview of Mathematics Microteaching, the shortcomings of Mathematics Microteaching and the improvement measures of Mathematics Microteaching.

In terms of the overview of Mathematics Microteaching, previous studies put forward the connotation of Mathematics Microteaching, and point out that Mathematics Microteaching has the characteristics of clear objectives, timely feedback, measurable, intuitive, time-saving, small psychological burden of students and repeatability. They also put forward six implementation steps of Microteaching: studying and researching in advance, determining the classroom teaching skills to be trained, watching the micro teaching demonstration video, designing and writing teaching plan, carrying out practical teaching activities, immediate feedback and evaluation. In terms of the shortcomings of Mathematics Microteaching, previous studies have pointed out that there are deficiencies in Mathematics Microteaching, such as lack of theoretical research, lack of equipment, shortage of mathematics curriculum resources, insufficient teaching hours, improper curriculum arrangement, limitations of simulated classroom, lack of teachers, insufficient attention of students, and imperfect evaluation system. In terms of the improvement measures of Mathematics Microteaching, in the past researches, some improvement measures have been put forward, such as increasing the input of Microteaching equipment, strengthening the construction of Mathematics Microteaching curriculum resources, increasing the class hours of Mathematics Microteaching, combining Microtraining with educational practice, improving the quality of Mathematics Microteaching teachers and perfecting the evaluation system of Mathematics Microteaching.

As you can see from above that the past researches about Mathematics Microteaching mainly focus on the three aspects: the overview of Mathematics Microteaching, the shortcomings of Mathematics Microteaching and the improvement measures of Mathematics Microteaching, which have the important guidance function. However, there are still some shortcomings in previous studies. First of all, previous studies mainly use the methods of speculation and reference to previous studies, but lack empirical research, the views are not convincing enough. Secondly, there are still gaps in previous studies. What is more prominent is how to classify mathematical skills so as to meet the characteristics of the subject and facilitate Microtraining. Therefore, it is necessary to improve the research methods in the future and conduct research from a broader perspective in order to improve the research on Mathematics Microteaching.

5. Conclusion

According to the summary and analysis of the previous researches, the writer thinks that the current domestic research mainly focuses on three aspects: the overview of Mathematics Microteaching, the shortcomings of Mathematics Microteaching and the improvement measures of Mathematics Microteaching.

The advantage of the previous researches lies in the systematic analysis of the problems existing in Mathematics Microteaching and the improvement measures, which has an important guiding role.

There are still some shortcomings in previous studies. The research methods are mainly speculative and lack of empirical research. At present, there are still gaps in previous studies. What is more prominent is how to classify mathematical skills so as to meet the characteristics of the subject and facilitate Microtraining. Therefore, it is necessary to improve the research methods in the future and conduct

research from a broader perspective in order to improve the research on Mathematics Microteaching.

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