The Construction and Practice of the Training Mode in Simulation Teaching for Primary Education Major

Taking Harbin University as an Example*

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***Abstract*—Basing on Skinner's program teaching mode theory, brothers John's Cooperation theory and Dewey's Learning by Doing theory, and some relevant research results on teaching skills training , we construct several training modes in the simulation teaching which is a part of the course "Primary Mathematics Teaching and Research". The feedback of the teaching in past years shows that these modes can effectively alleviate the contradiction between the insufficient training time and the training efficiency.**

Keywords—primary education major; simulation teaching; training mode

I. INTRODUCTION

A. Background

"Primary Mathematics Teaching and Research" is a key course in curriculum system of primary education major in Harbin University. Besides theories which are conducive to learners' teaching work after their graduation, there is also practical part which is called simulation teaching for training their teaching skills. This course features combining theoretical part with simulation teaching.

According to the specific of the training of simulation teaching, in each class the students are assigned to perform simulation teaching one by one, and the time of teaching is occupied by the learners linearly. When the class hours of the course are few, and the course is taught in a larger class, the lower efficiency of training and the poorer effect of training will be highlighted.

The results of research [1][2][3] show that most studies are focus on the practical teaching or the teaching skills, while there were few researches on simulation teaching process in course. It is an urgent task to explore a reasonable and efficient mode of simulation teaching and training in course.

B. Theoretic Bases

B.F. Skinner is a famous educational psychologist in US. His procedural teaching mode, based on the theory of operant conditioning and reinforcement, is a teaching mode suitable for individualized teaching. It is a representative of behavior oriented teaching design mode. There are two key factors in the program teaching design: one is the compilation of the teaching material, the other is the use of the teaching machine, that is, the presentation of the teaching material.

Johnson Brothers, educationalists of the "Cooperative Learning Center" at the Minnesota University in the United States, are one of the most important representatives of the cooperative learning. They believe that cooperative learning is based on teams and students work together to improve their own and others' learning. Cooperative learning must have the following five elements: positive dependence on team members, face-to-face interaction, unshirkable personal responsibility, social interaction skills and group cooperation skills, and self-evaluation within groups. [4] He pointed out, "listening carefully, positive thinking, hands-on practice, self-exploration, cooperation and exchange are important ways of learning mathematics. Therefore, it is an important skill for primary school teachers to guide students to carry out cooperative learning. So it is necessary for students of primary education major, who will become teachers after graduation, to grasp the "guiding" skills. "Learning by doing" is the central idea of American educationist Dewey's teaching theory. It means that only by doing "experience" can we gain knowledge and learn something. Applying this theory to learning guiding skills, primary education majors can achieve "cognition and understanding" through participating in cooperative learning, and freely control "cooperative learning", that is, to achieve the goal of guiding pupils to cooperate in learning as in "Fig. 1".

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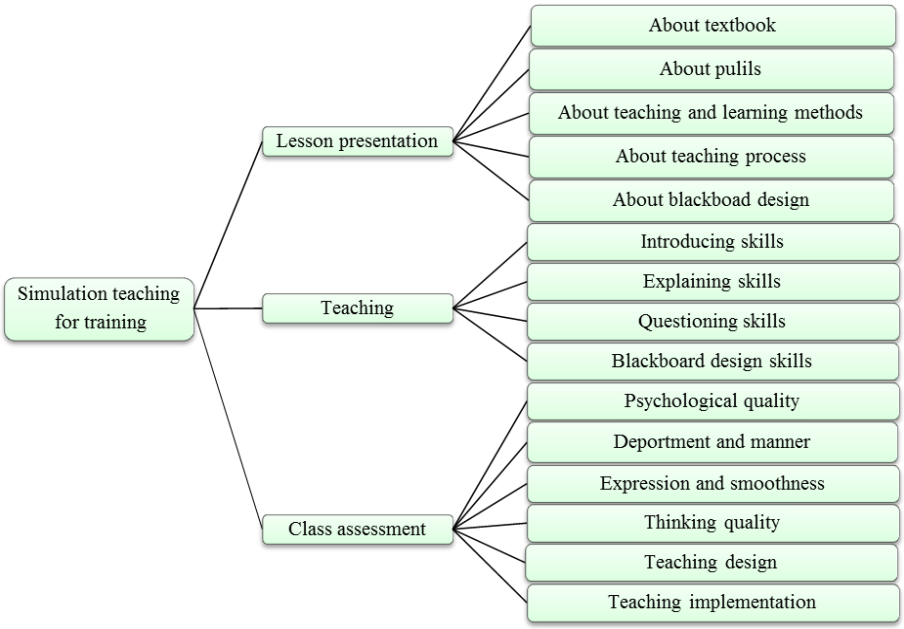

Fig. 1. Simulation teaching for training.

To sum up, the main theoretical bases of the study are as follows: the theory of program teaching design, the theory of cooperative learning and the theory of learning by doing.

II. PROCESS OF STUDY

The goal of simulation teaching for training learners is to master teaching steps for a new lesson, and can use properly conventional skills in the class (such as introducing skills, explaining skills, questioning skills and blackboard design skills etc.) to complete teaching within specified time. Learners can explain the intention of teaching design, and can assess class from different perspectives. Learners can master the basic principles and processes of cooperative learning through their own cooperative learning. It can be seen that the main task of simulation training is to improve learners to master a variety of common teaching skills through training. And how well the learners master the teaching skills can be evaluated through the observation of the classroom. Through the teaching training, we can exercise the basic teaching skills of the learners; improve their ability to analyze textbooks and their ability to solve teaching problems. Through lesson presentation training, we can cultivate learners' good habits of combining theory with teaching design, which can reduce the randomness of their teaching design. Through class assessment training, we can cultivate learners' ability to observe the classroom from multiple perspectives and the ability to express their viewpoints fully.

According to Skinner's program teaching mode theory, through our simulation teaching designs of the course "Primary Mathematics Teaching and Research", we first divide the necessary practical knowledge into three parts: lesson presentation, teaching and class assessment. And then refine them into some relatively independent and logically related parts, as shown in Fig.1. Learners need to grasp the five aspects and the specific contents of each aspect about the lesson presentation. As to teaching skills, learners need to be able to use some conventional teaching skills to teach. To practice the skills of class assessment, learners can evaluate a class from six aspects. Finally, according to the needs of the course, we design the training forms and order of the skills.

We used several combination training modes, as shown in "Fig. 2". According to the division of curriculum contents in "Mathematics Curriculum Standard for the Compulsory Education (2011 Edition)", we chose three parts as the contents of simulation teaching and training: number and algebra, graphics and geometry, statistics and probability. And we did not make fixed match between contents and modes.

According to the scoring rule, we divided the training mode into team training mode and individual training mode. The scoring rule for team training is “the same team, the same score”, which means that in this training, the final score of each member in this team are all same, which is the average, score of all members’. The score of each member goes hand in hand with the team. And the scoring rule for individual training is “the same team, different score”, which means that the final score of each member in this team is given by teacher on the performance of his own actual job. It has nothing to do with the performance of other members.

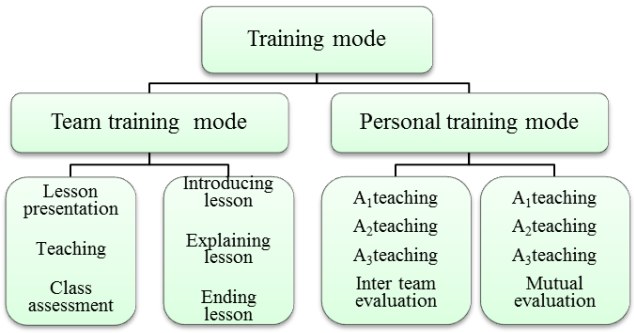

Fig. 2. Several combination training modes.

A. Team Training Mode

The number of members of each team is determined according to the number of learners in the class. Each team is composed of two, three, or four members. The way to create a team can be determined according to the actual needs, by learners, or by the teacher. In the following part, we take a team, composed of three members, using A to represent the team's name, and using A_1, A_2 and A_3 to represent the three members of team A, but do not refer to the fixed members.

1) "A_1 lesson presentation, A_2 teaching, A_3 class assessment" interaction mode: Interaction means that the non-trainees are required to play the role as pupils to cooperate with the trainees in their teaching to create a more realistic teaching environment. Through interaction, learners can grasp pupils' knowledge reserves and analyze their blocking points, which is very helpful for improving teaching design level and improving the analysis ability of the key and difficulty in a lesson.

In this mode, two teams can be trained in 90 minutes. A_1, A_2, A_3 need to complete different jobs of a lesson in 25-35 minutes. Learners can choose their trained skills according to their team's wish. It is required that the lesson presentation of A_1 should be in accordance with the teaching of A_2, and the lesson evaluation of A_3 should be relevant. Teacher will assess the performance of the whole team and each member after they complete their training. It will make members more clear about their roles and tasks in the cooperation of their next round of training.

2) "A_1 introducing lesson, A_2 explaining lesson, A_3 ending lesson" interaction mode: In this mode, two teams can be trained in 90 minutes. A_1, A_2, A_3 need to complete different jobs of a lesson in 25-35 minutes. Learners can choose their trained skill according to their team's wish. It is required that the teaching situation is reasonable, the questions are well-designed, the exercises are at different levels, the summary is refined, the homework is appropriate amount and typical. In addition, it is also required to cooperate smoothly and reflect the integrity. Teacher will give a brief analysis of the rationality of the teaching goals, the key points and the difficulties that are set by the team. And teacher will evaluate the achievement of teaching goals, and judge whether to highlight the key points and break the difficulties through teaching. And then teacher will show the common teaching process of similar lessons. Furthermore, the teacher will comment on the achievement of their cooperation in the preparation and evaluate the performance of the three learners respectively. Finally, the teacher will put forward a plan to improve the effect in their cooperation training in the next round.

B. Individual Training Mode

1) "A_1 teaching, A_2 teaching, A_3 teaching, inter team evaluation " interaction mode: In this mode, three teams can be trained in 90 minutes. A_1, A_2, A_3 need to teach different lesson in 10 -15 minutes. Learners can choose the lessons according to their own wishes. The teacher sets the fixed observation perspective for the non - training team before training. After teaching, a representative of each observation team evaluates the trainee's teaching performance within 1 minute from the preset perspective. All members take turns as representatives. The perspectives of the evaluation teams are different each time. Such training will ensure that every member of each team has the opportunity to develop his ability of observation and evaluation from perspectives.

2) "A_1 teaching, A_2 teaching, A_3 teaching, mutual evaluation" Non Interaction Mode: Non interaction means that the non-trainees are required not to cooperate with the trainee in teaching, just observe the process of the simulation teaching.

In this mode, A_1, A_2, A_3 are required to practice heterogeneous forms for the same lesson. That means they have to choose the same lesson to teach. And different teaching designs should be carried out according to the preset conditions of the pupils, the preset teaching environment and their own characteristics. This is a difficult training for the learners, because it's not easy to achieve unique display styles. This form of teaching is often used in the interview for the national teacher qualification examination and for most employers. Therefore, it's necessary for learners to carry out the training. This teaching mode can test the teachers not only their psychological quality and their understanding of the pupils and their teaching design. It is very difficult for learners to practice heterogeneous forms for the same lesson, each member of the team needs to study textbooks, teaching and studying methods carefully, try not to communicate with each other.

In this mode, two teams can be trained in 90 minutes. After the three members' teaching, each member will first evaluate his own teaching, then evaluate the teaching of the other two partners, and compare the teaching of the three.

Because there are not enough class hours in the course, it is necessary to improve the efficiency of training each time. During the teaching of the course in the past years, the above four training modes were usually combined according to different training objectives. The ideal results have been achieved.

III. ANALYSIS

Skinner's program teaching design should follow several principles: the small-step principle, the immediate-feedback principle, the self-adjustment-paced principle and so on. Our design of simulation teaching training has carried out these principles well.

In accordance with the small-step principle, the teaching tasks of each round of training are not large and the number of knowledge points is small. Most of the tasks are relatively complete teaching contents that can be completed in about 15 minutes. This design enables the learners to reach a part of the training goal in each round of training and achieve all the goals step by step.

According to the immediate-feedback principle, teachers or partners will feed back and evaluate learners' on-site performance timely after his job. The practice has proved that the positive evaluation helps to enhance his confidence, and increase his acceptability of the negative evaluation, and improve his sense of professional identity.

Through years of observation, we found that, usually, learners showed a weak sense of cooperation in the first round of training. Some members were only responsible for completing their own tasks well but did not care about the progress of the partners and the team. Therefore, our goal of the first round of training should include not only the mastery of conventional teaching skills, but also the principle and process of strengthening cooperative awareness to master cooperative learning. We could achieve the goals by making the scoring rules described earlier. It is hoped that the learners will realize that unless the other members succeed, they will not be able to succeed alone. On the contrary, it is the same.

After each round of training, teachers will choose the skills of the next round of training according to the achievement of training goals, and select the combined training modes of next round, which embodies the self-adjustment-paced principle.

IV. CONCLUSION

The learners of primary education major can master some essential teaching skills through simulation teaching in the “Primary Mathematics Teaching and Research” course. Because of the lack of class hour, the time and frequency of each learner's participation in simulation teaching are not sufficient, which is not conducive to the consolidation and skillful application of teaching skills. The best way to solve this problem is that more relative courses are formed together to accomplish the tasks of training the learners to master the teaching skills.

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