



Research on Chemistry Teaching Skills in Middle School Under Micro-Teaching Environment

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ABSTRACT

Teaching skills are the foundation of teacher's ability, and normal students, as the reserve army of future teachers, should train teaching skills consciously in their daily life. As a modern teaching technique widely used in training normal students, micro-teaching is of great significance to explore the cultivation of teaching skills. It should be widely introduced into the training of normal university students. However, there are relatively few researches on teaching skills in micro-teaching of chemistry at present, so we devote to studying the key skills that normal students should master in micro-teaching and the training methods of chemistry teaching skills under micro-teaching environment. This paper will use the practical cases in Chinese middle school chemistry teaching to help normal university students majoring in chemistry to master four key teaching skills: import skills, questioning skills, blackboard writing skills and reinforcement skills, so as to help them achieve the ideal teaching effect.

Keywords: Micro-teaching, Normal students, Teaching skills training, Middle school, chemistry

INTRODUCTION

Attaching great importance to the improvement of teachers' skills and qualities, strengthening the construction of teachers are the foundation to consolidate education. Normal students are the main force of teachers, and colleges, universities bear the key responsibility of training normal students. In the past, most colleges and universities in China only set up theoretical basic teaching courses when teaching normal courses, and rarely trained individual teaching skills. In actual teaching, they even gave no mention. Since this problem began to attract wide attention, many colleges and universities began to seek solutions to the problem, and finally shifted the carrier of normal students' teaching skills training to micro-teaching.

At present, micro-teaching training mode has been favored by many Chinese universities, and

has been applied to cultivate and train the teaching skills of normal students. Although micro-teaching has not been formally used for a long time in China, remarkable results have been achieved in its current use [1].

However, when most Chinese scholars' study micro-teaching, their main research direction is theoretical research, that is, how micro-teaching affects normal students and how to evaluate micro-teaching skills. In addition, the research literature on micro-teaching of corresponding disciplines mainly focuses on mathematics, English, biology and other disciplines, while the research on chemistry is relatively few. Therefore, this study is expected to bring enlightenment to the micro-teaching of chemistry.

CORE CONCEPTS DEFINITION

Micro-Teaching

Micro-teaching is the most extensive translation in China [2]. "Micro-teaching" reflects not only the "short" in the sense of time, but also the "less" in the concept of space, that is, the length of teaching time and the relatively small teaching capacity. The "lattice" in chemistry micro-teaching can be interpreted as norms, and there should be norms for different and various teaching skills [3]. Besides, it can also be called "miniature teaching", "small teaching".

micro-teaching is actually a teaching method that provides a special practice environment, simplifies the daily complex classroom teaching (only for a small number of students, the time is cost about 5-20 minutes) and helps the practitioners to obtain effective feedback information and videotape the teaching process. Its notable features include miniaturization of subject training, standardization of skill movements, audio-visual recording process, and timely observation and evaluation [4], which eliminates the influence of the pressure of facing a large number of students on teachers. It can also save lecture time and classroom capacity. It is vivid and intuitive, so that the people can know themselves vividly like looking in a mirror. In such cases, it is often easier for normal students to master teaching skills.

micro-teaching originated in the United States in the 1960s and was welcomed by many schools and teachers around the world as soon as it appeared. After the United States, many European countries have also introduced this teaching model. micro-teaching was introduced relatively late in China, in the mid-1980s, and gradually put into use [5]. When micro-teaching was first introduced in China, it was mainly used to train in-service teachers, and then gradually used to train normal students through continuous experiments.

Teaching Skills

Skills refer to the consolidated and automated activities acquired through practice, which extends to the concept of teaching skills that teachers use the existing teaching theoretical knowledge to form a stable and complex teaching behavior system through practice.

More specifically, the definition of teaching skills widely recognized in our country currently refers to a series of behaviors taken by teachers in different educational situations to achieve certain goals and goals based on teaching theories, professional knowledge and experience [6].

TYPES AND REPRESENTATION OF MICRO-TEACHING SKILLS

The contents of micro-teaching skills are very rich, which can be subdivided into skills of import, skills of questioning, skills of change, skills of reinforcement, skills of blackboard writing, skills of language, skills of experiment demonstration, skills of classroom regulation, skills of multimedia teaching, skills of closure, skills of explanation, skills of organization, skills of trial and error, skills of present a teaching plan, skills of information-based teaching, etc [7]. Due to the limitation of the length of this paper, we only focus on four key teaching skills, namely, import skills, question-asking skills, blackboard writing skills and reinforcement skills, and discusses their application and matters requiring attention in modern middle school chemistry teaching.

Import Skills

Import skills is to bring students into a specific situation with a purpose and arouse their interest and attention to the course, so it is also known as directed introduction [8]. In chemistry teaching, the key methods of mastering Import skills include:

Straight to the Point:

For example, in the "law of Conservation of mass", in the beginning of the class on the appropriate to remind students that this content occupy a large proportion of the ordinary high school entrance examination in the past years, and it is the basis of a lot of chemical calculation that will be learned in the future, so student should make a solid foundation through the study of this part.

Question:

Such as the subject of "molecules and atoms", what chemical principle is implied by the ancient proverb "Wine fragrance does not fear lane depth? "To introduce a new lesson.

Contact with the Actual Life:

For example, in the study of "Ethylene", first let the students think about the reagents and phenomena used to ripeness bananas, in order to contact the content of the new course into the new course.

Use an Experiment as a Beginning:

For example, in "Chemical Properties of Metals", the bright iron wire after rust removal is first put into copper sulfate solution and taken out after waiting for a period of time. A layer of purple-red substance is observed on the surface of the iron wire. Students will be interested in this phenomenon, which will further arouse their interest in the following new lessons.

Review Old Knowledge to Gain New Insights:

For example, when learning "Factors Affecting Chemical Balance", students can first recall factors affecting chemical rate, undertake the learning of new knowledge in analogy and analysis, and associate old knowledge.

Questioning Skills

Socrates' most famous theory, which called "midwife technique", is the earliest questioning teaching method [9], and psychologist Rigg is the most representative figure in questioning at present [10]. Rigg believes that "questioning is any narrative sentence that tries to elicit a verbal

response" [11], and he puts forward that the functions of questioning fall into three categories. The first is to help students think and express their opinions; The second is to check the students' grasp of knowledge and skills, and give guidance; The third is to attract students' attention and play a role in the management of classroom order [12]. In China, the educator Confucius was the first one to study teaching questioning skills, it can be reflected in the Analects of Confucius and his disciples, in which he writes: "Do not enlighten a student until he has tried to understand but can't; Don't enlighten him until he knows it but can't express it perfectly". That is to say, heuristic teaching is inseparable from questioning.

Questioning Skills is consisted of mental skills and Motor skills [13]. Mental skills enable teachers to design different levels and types of questions according to the teaching objectives, teaching content and specific learning conditions of students at different levels, seize the right moment to raise questions, choose the right answer objects and the right way to ask questions, and give appropriate guidance to students' answers and give reasonable evaluation and feedback to their answers. Motor skills are the expressions, gestures and intonations used by teachers when they raise questions. Therefore, questioning is not a simple question thrown randomly in class, but a whole process of asking, waiting to be answered, guiding the answer and concluding the question. Questions skills that can be mastered in chemistry study are:

Recall Questions:

For example, before learning how to correctly write chemical equations in the new lesson, recall and ask questions about the relevant definition of the law of conservation of mass in the last lesson.

Understanding Questions

For example, when it is found that students do not have a good grasp of the concepts of compounds, elemental substances, pure substances, mixtures and oxides, and cannot tell the difference accurately, they should ask the students questions about the categories of carbon dioxide, oxygen and hydrochloric acid, so that the students can clarify the concepts.

Application Question:

For example, after learning the valence, ask the students whether they can write the chemical formula of magnesium oxide and silicon oxide by using the valence of common elements they have learned.

Analytical Questions:

For example, when learning the elemental carbon, ask the students about the relationship among the structure, properties and uses of the substance after learning the structure, properties and uses of diamond.

Comprehensive Questioning:

Comprehensive questioning allows students to creatively apply the knowledge they have learned to solve new problems, and requires students to find new connections with the innovative combination of knowledge they have learned. For example, when teaching the law of conservation of mass, the students found that hydrochloric acid and sodium carbonate powder in the experimental device after the reaction appeared before and after the reaction mass imbalance phenomenon, to ask the students to cause the imbalance is what, how to

improve the experiment.

Evaluative Questions:

For example, after learning the nature of carbon dioxide, students were asked to evaluate their learning results.

Blackboard Writing Skills

Blackboard writing skills refer to the teaching behavior mode that teachers use the blackboard to convey teaching information through classroom teaching with concise words, symbols and charts [14]. To "write" and "show" along with teacher's "speak" and "teach", is a particularly important teaching auxiliary means, with intuitiveness, vividness, conciseness, example, enlightening and aesthetic. Blackboard writing is a key skill to evaluate the teaching level of normal students, which occupies a great proportion in the skill examination of normal students. But in reality, there is a lack of relevant training courses for blackboard writing skills, and there is an over-reliance on multimedia and neglect of blackboard writing, we need to be aware of that phenomenon. To master Blackboard writing skills, the types of blackboards writing of chemistry subjects should be known. They are:

Outline Blackboard Writing:

That is, the outline of content of lecture. The predecessor of the 20th century Soviet Union prevailed and was promoted to the world "outline signal diagram method" blackboard writing mode.

Tabular Blackboard Writing:

The content of blackboard writing is presented in the form of a table, which is mostly used to distinguish the similarities and differences between some concepts or substances.

Inclusive Blackboard Writing:

It is a type of blackboard writing that represents concepts and their affiliations. It has distinct species and plays a positive role in developing students' thinking abilities such as inductive ability and deductive ability, as well as helping students to understand the relationship between the whole and the part.

Graphic Blackboard Writing:

The use of graphics with special meaning, or to draw lines and arrows, or the use of symbols and other forms of blackboard writing.

Linear Blackboard Writing:

The content of blackboard writing is presented as a logically interrelated straight line, which is often used in the learning of procedural knowledge.

In addition, there are main blackboard writing (generally used to write the outline of the class, including the topic name, teaching main points, teaching secondary points, etc., written on the left or occupy the middle of the blackboard, retained until the end of class, not easily erased) and auxiliary blackboard writing (to the classroom teaching auxiliary supplement, written on the right side, it can be erased at any time if you need to draw new things on the blackboard). By the way, in a certain section of micro-teaching, blackboard writing is often not limited to one

type, but combines a variety of blackboard writing types to be used flexibly.

Reinforcement Skills

The psychological basis of reinforcement skills is Skinner's operant conditioning theory [15]. Reinforcement skills refer to a series of behaviors used by teachers in classroom teaching to enhance and promote students' response to teaching and maintain learning motivation, which can make students' good behaviors repeat and restrain bad behaviors [16]. But in practical teaching, reinforcement skill is always a kind of teaching skill which is ignored in theory and often used unconsciously in practice. For example, chemistry teachers usually use prominent marks on the key words of chemistry concept when making PPT, or unconsciously raise the intonation and slow down the speaking speed when talking about the important and difficult points in class, or even emphasize the key knowledge repeatedly, or ask students to practice the chemistry topics corresponding to the knowledge of this class in class. In fact, these are strengthening the application of skills in first-line chemistry classroom teaching.

According to the specific ways in which chemistry teachers use reinforcement skills in first-line classrooms, the reinforcement skills to be mastered in teaching can be divided into the following types:

Language Reinforcement:

The first type is oral language reinforcement: for example, when students answer questions correctly, the teacher verbally praises them: "You have answered very well, you have applied the knowledge what you have learned before to solve problems flexibly." If the student gives an unsatisfactory answer but he has a good attitude, the teacher can encourage him with a gentle language, saying, "Your mind works so fast, but the answer is not complete. Please continue to think about this question. I expect a better answer from you." The second is written language reinforcement: for example, to remark "Write neatly " or "Try harder next time, you can do better" in a student's homework.

Action Reinforcement:

Teachers should pay attention to adapt to the teaching content and keep a good sense of proportion when using it. Actions and expressions should be natural and not exaggerated. In the teaching process, teachers can walk around in the classroom appropriately and indent the distance between teachers and students, which can not only make the classroom atmosphere lively and harmonious, but also obtain the feedback information from students.

Sign Reinforcement:

For example, teachers can underline or mark key knowledge when talking about key points or difficult points, so as to strengthen students' attention to knowledge points and deepen their impression of knowledge. Teachers can also leave the non-toxic, harmless and non-dangerous experimental products as souvenirs for students in the experimental class, which not only deepens students' impression on the experiment, but also improves students' interest in chemical experiment.

Activity and Competition:

For chemistry, competition, tutoring activity and operation activity are the three kinds of reinforcement activities most often used by chemistry teachers in class.

TRAINING AND IMPLEMENTATION OF CHEMISTRY TEACHING SKILLS OF NORMAL STUDENTS IN MICRO-TEACHING ENVIRONMENT

Firstly, several basic requirements of teaching activities should be made clear: first, the purpose of training should be clear and the focus should be highlighted; Secondly, the feedback of information should be intuitive, visual and timely; And then, we should pay attention to the main role (normal students)and give them enough space to show themselves. Finally, we should make full use of various media technologies such as sound and video.

Skills training in micro-teaching can refer to the following steps:

Watch "Demonstration Film"

It means to provide a teaching skills training template for normal students;

Lesson Preparation

Normal students prepare for their class based on the skills to be trained;

Trial

The students, composed of five or six people micro-class, take turns to teach. Note that the whole process of the trial should be recorded accurately;

Feedback and Evaluation

Including evaluation of teaching performance by university teachers and other peers, peer mutual evaluation and self-evaluation;

Adjust

Optimize the teaching of the next class based on evaluation [17];

Acceptance

Teachers can use the "imported skills evaluation sheet" in the lecture (shown in the following table) to realize the final recognition of students' teaching skills training.

Table 1. Teaching skills evaluation list (sample model)

Speaker:	Date:	Evaluation sheet:
Evaluation index	Evaluation grade : Average, good, excellent	weight
overall evaluation		

CONCLUSION

With the rapid development of information technology and network education, the traditional micro-teaching model of chemistry has suffered a certain impact. In this process, the combination of chemistry subject and micro-teaching mode is not perfect. In addition, the implementation of curriculum standards in the new era has put forward higher requirements for the micro-teaching skills of college chemistry normal university students ^[18]. Therefore, only by persisting in development and improvement and advancing with the times, can micro-teaching achieve continuous and effective progress [19]. In particular, it is necessary to get rid of the problem that the development of micro-teaching just focuses on theory rather than practice. In this regard, colleges and universities can set up compulsory courses related to micro-teaching, add training courses, and make the development of micro-teaching not limited to on-site, online courses may also be a good attempt. Field practice opportunities for normal students can also be increased, or micro-teaching skills training competitions and activities can be held to encourage normal students to train their teaching skills.

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