The Reform and Innovation of College Basic Chemical Experiment

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Abstract. University of basic chemistry experiment is one of the basic course for students majoring in chemistry, is to cultivate students' practice ability, innovation ability of the main course. Its relationship with the transformation of theory and practice. Consequently, to better complete the teaching goal, to improve students' operation skill and innovative ability, must break the traditional teaching mode, original from aspects such as teaching contents, teaching means and examination mechanism reform innovation.

Introduction
Chemistry is a based on the experiment of the discipline, no solid theoretical knowledge and the skilled experiment skill is really hard to do innovation [1-4]. Basic chemical experiment as the first step on the student to study the deep chemical is particularly important, it is the knowledge, ability and quality education, cultivating students' innovative thinking and innovative ability is one of the most effective means. Traditional experiment teaching on the teaching idea didn't consider the foundation, the ability of students and special skills, use of one's education mode; On the teaching content, basically is a classic experiment or the verification experiment, not from the real life closely linked, scripted, teacher speak what students what to do; On the teaching method, by using the obsolete or instruments cannot match the progress of science and technology, students can seldom come into contact with the new type of instrument. These aspects greatly limits the students' innovative ability cultivation and interests. Through many years of teaching practice and reflection I think the basic chemistry experiment reform and innovation should be mainly embodied in the following respects.

Improve Teachers' Innovative Thinking, Enrich the Teaching Content, Training Students' Innovative Thinking

Improve teachers' ability to innovate
Teacher is the subject of experiment teaching, as well as the experimental teaching. The traditional teaching mode, the teacher uses the force-feeding teaching method, mechanical existing knowledge and experimental considerations to speak out, with a combination of classical experiments and verification experiments to make most of the experimental teachers' lack of independent thinking ability and innovation ability. It also suppresses the students' autonomous learning spirit and innovative thinking. Therefore, teachers must experiment from the following several aspects to improve their innovation ability. First, cultivate the ability to keep on learning and habits, whether formal or informal knowledge is helpful to the cultivation of innovation ability. So teachers must learn extensively, and continuously improve their depth and breadth of knowledge, such ability on the basis of excellence, innovative concept is put forward. Secondly, the establishment of open discussion and respect other people's attitude. In traditional education, some are good at express his opinions are called "alternative", which was reduced. With the arrival of knowledge economy, the individual is wisdom and innovation is more and more attention, and teachers in the teaching, to adhere to the attitude of openness and respect, open the student’s innovative thinking. Finally, the teacher must be familiar with the teaching material, continuous mining resources from the textbooks. Only teachers to each experiment link and process are
familiar with, can continuously put forward new experimental methods, so as to better guide the student experiment, cultivate students' innovation ability.

**Enriching the content of experiment teaching**

Concept of the traditional experimental teaching in colleges and universities, it is put forward in the 1950 s "sanki" ability, training students' ability to master the basic knowledge, master the basic operation ability, grasps the basic experiment. In the '60 s and put forward to cultivate students seeking truth from facts and the fine quality of thrift. Based on traditional teaching concept, basic chemical experiment in teaching content set too rigid, on the training target is limited to cultivate students' basic experiment skills and it is strictly prohibited to scientific thinking, and in the level of experimental teaching, mainly according to the established experimental project to do experiments, not the embodiment of the students' independent innovation experiment, greatly limits the students' innovative ability. After years of practice, I think that the experiment teaching content can be changed from the following several aspects. First, on the basis of the original experimental operation skills, set some new and interesting experiment topic. Such as: in titration analysis experiments, for example: we often mutual titration using NaOH and HCl, this experiment involved is in high school chemistry section, some students have been familiar with the whole experiment process, so the experiment interest and enthusiasm is not high, so the students master the calibration method of the standard solution and alkali type buret used, method of weighing, indicator selection, basic operation and basic technology such as data processing method, in order to make the students will learn the basic knowledge and skills of applied in the actual life, we can design an experiment "determination of the industrial waste acid content", lets the student with the basic experiment skills from environmental protection and detection of two kinds of thought experiments, such already can exercise the student's basic operation, and can arouse students' interest in learning. Second, increase the independent innovative experiments. Given the experimental subject, let the students according to their own interests and hobbies, self-designed experiments through data access solutions. For example, Let the students design and preparation of ammonium ferrous sulfate solution, after receiving the design experiment subject, students will look up the literature, study relevant knowledge, maximum limit arouse the students' subjective initiative to improve students' abilities control knowledge and process knowledge, develop students' innovative thinking. Third, add some related to the theoretical teaching of the experimental subject. Let students will learn the theoretical knowledge applied to practice, combing the students knowledge, let the student as soon as possible from the "transition" period to adapt to come over, at the same time to improve students' interest in the whole university chemistry learning.

**Change the teaching facilities and means**

The experimental teaching facilities is the basis of the students complete the experiment, also exercise the student beginning ability. Only by constantly update new equipment, to increase the students' skills, in conformity with the economic development and social progress, thus improving the students' innovation ability. Basic chemistry laboratory instruments used are usually some basic instrument and glassware. We can try the following: First of all, the replacement of some old facilities, such as use the electronic balance instead of the traditional analysis or platform scale for weighing scales, the experimental data is accurate and close to the frontier science; Secondly, the introduction of new glass apparatus, change traditional way of instrument installation, etc. On the teaching method, can be used in a group discussion method or heuristic teaching, arouse students' learning enthusiasm and interest in learning; Change the teachers' overall teaching mode, teachers can speak only the key considerations and experiments, and then let the students to do, learn, fully mobilize students' subjective initiative.

**Opening laboratory, open students' innovative thinking**

Opening laboratory is to cultivate innovative talents, to carry out one of the most effective form of their aptitude, and fostering the student individuality, highlighting features and potential of the
students and effective form of laboratory open has an irreplaceable role in the process of teaching [5-6]. Opening laboratory including in-class open, a variety of forms such as extracurricular open and make an appointment. Limited by our laboratory, we can often take the following three types of open form: First, the open classroom. In our experiment teaching are lesson arrange every four hours. Some kind of learning good students about two hours or so the experiment contents can be completed, for these "do not have enough to eat" students we can provide more experimental content, As the experiment of experiment, or the same experiment can provide different experimental methods, can also provide some research project, give full play to this part of the students' potential and interest. Second, open outside. Our students is limited by the total school, after school time is less, but some students have strong interest in experiment, some poor students experimental basis, experiments didn't finish the experiment content, the lab can take advantage of the evening and weekends open to the students. Students who are interested in the experiment and has the potential to can open some investigative experiments, experimental basis of poor students can open class didn't finish the experiment, the experimental level. Third, make an appointment to open. Such open form mainly in view of the students have strong interest in the experiment, laboratory can arrange teachers undertake to the student guidance, in the appointment time and related experimental students to discuss topics. Through the above experiment open form the real consolidate students' basic knowledge, basic skills, improve students' innovative ability.

For examination mechanism of innovative thinking

University examination is not competitive, we should mainly examines the students' thinking ability, creative ability, and establish reasonable evaluation mechanism, comprehensive and objective evaluation of student achievement, can guide the student to the flow of autonomous learning, and constantly explore, improve their knowledge application ability and innovation ability. Thus, examination form can take peacetime assessment, the experiment and theory of examination three forms. The first is examination at ordinary times, attendance situation assessment of student experiment, the experiment operating conditions and the final experimental results, through the experiment prepare reports and report review it to check the students' experiment attitude seriously. Followed by experiment examination, At the end of each semester. The experiment for this semester. All the experimental operating subject, random experiment subject or transform the experimental test of the same skills, the experiment teachers is responsible for the examination, test students' practical ability. Finally the theoretical examination, mainly basic experiment skills, attentive matters for data processing and experiment for examination, examination students theoretical knowledge. Through three assessment mechanism, to consolidate and strengthen students' experimental skills and theoretical knowledge, to enhance students' analysis and solve problems and actual beginning ability, raises the student good experimental habits.

Conclusion

Above all, the basic chemistry experiment base, new in the reform. We only by constantly innovative consciousness and innovative teaching ideas, through the basic chemistry experiment teaching contents, teaching means and examination mechanism reform, in order to give full play to student's main body function, improve the students' theoretical knowledge and basic experiment skills, to cultivate students' ability to analyze and solve problems. Make students' innovation ability and the overall ability get promoted.

References


