

# Discussion on Teaching Reform of Basic Course of Engineering Chemistry

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**Abstract:** The teaching purpose and idea of modern chemistry basic course in China is to take students as the education center, pay attention to the actual needs of students, and promote the reform of modern education classroom by evaluating the training objectives. The basic course of engineering chemistry is a comprehensive basic theory course of chemistry, which pays attention to the cultivation of students' ability to solve practical problems. As the reform and exploration of education classroom, we can effectively evaluate and reflect students' learning by establishing a complete teaching evaluation system, combine various multimedia means, and enhance students' learning interest, as well as innovate classroom teaching means, in order to improve the level of classroom teaching technology, make the basic engineering chemistry teaching recognized by all sectors of society, and improve students' autonomous learning ability and inquiry and innovation literacy.

**Keywords:** Engineering Chemistry; Basic Courses; Reform in Education

Under the new background of engineering construction, the professional curriculum education in colleges and universities should meet the needs of the development of higher education in the new era. The basic course of engineering chemistry is particularly important for cultivating scientific and applied talents, promoting the industrialization of engineering chemistry scientific and technological achievements, and realizing the construction of engineering chemistry scientific and technological economic system, the development of engineering chemistry science and technology and the development of society. Therefore, it is necessary to further clarify the curriculum ability objectives, establish a reasonable teaching model and scientific evaluation and assessment system, and reform and explore the curriculum education, as well as further improve the competitiveness of college students, in order to ensure and improve the teaching quality of the course in the limited teaching time, so that students can really master relevant knowledge and apply what they have learned,

## 1. Problems in the teaching of basic engineering chemistry

### 1.1 The assessment system is not perfect

Assessment is an indispensable part of teaching. The teaching of basic engineering chemistry needs a perfect and scientific evaluation and assessment system. However, at present, the evaluation and assessment system of most colleges and universities does not keep pace with the times, and there are some loopholes. Students can take advantage of these

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loopholes to conduct surprise learning before the examination and pass the examination. This makes the teachers of basic engineering chemistry unable to obtain effective teaching feedback in time, which leads to the decline of teaching quality and forms a vicious circle. In addition, the imperfection of the assessment system makes it impossible for a variety of teaching methods to be fully implemented and scientific and reasonable teaching methods to be formed, which reduces the classroom quality. Some students may also question the assessment results due to the imperfection of the assessment system, affecting their personal learning mood, and lead to the inability to carry out continuous learning, affecting their personal learning development.

### **1.2 Students lack interest in learning**

Through the in-depth observation of the classroom situation of the basic course of Engineering Chemistry, it is found that a considerable number of students do not perform well in the classroom, their enthusiasm and interest in learning engineering chemistry are not high, and even a considerable number of students engage in activities unrelated to the basic course of Engineering Chemistry in the classroom. At present, most colleges and universities in China are still implementing the traditional classroom teaching mode. Teachers directly instill a large amount of basic theoretical and comprehensive practical knowledge into students in classroom teaching, ignoring how to cultivate students' learning autonomy. Students are easy to gradually form a bad habit of passive acceptance of knowledge, and cannot really give full play to their subjective initiative and subjectivity in learning, thus losing interest in learning. In view of this, if we want to keep students' learning enthusiasm for a long time, we must constantly enrich teaching forms in the process of teaching, and enable students to maintain good interest in learning through diversified teaching forms.

### **1.3 The teaching method is too single**

Education in the new era must keep pace with the times. However, parents' expectations for students and evaluation of teachers often focus on grades. They judge students and teachers' ability by grades, which also lead to some teachers having to focus on grades. This leads most teachers to adopt a relatively single teaching method in order to ensure a certain teaching effect, lack the spirit of innovation and breakthrough, and tend to stay in the comfort circle brought by a single teaching method. This way of education not only leads to students' inability to absorb and use their knowledge to solve practical problems, but also brings disadvantages to the development of students' comprehensive quality. Especially with the growth of age and grade, the lack of practical problem-solving ability will also lead to students' loss of interest in learning, and then lead to the opposite effect.

## **2. Reform strategy of basic course teaching of engineering chemistry**

### **2.1 Building a scientific assessment system and effectively evaluating the learning effect**

Assessment and evaluation is not only an important part of the whole course learning, but also an indispensable part. Diversified educational methods need scientific and reasonable evaluation mechanism. Students' grades can not only be given from the grades and assignments of papers, but also be combined with subject research and scientific research reports to investigate students' inquiry ability, so as to give students' final grades more truly. This multifaceted assessment and evaluation method can more objectively reflect students' comprehensive ability in this course.

In order to comprehensively and effectively analyze and evaluate each student's specific learning situation and establish the whole process evaluation system, the comprehensive learning ability level of each student is evaluated and assessed through the interaction between traditional outcome evaluation, process evaluation, practical evaluation and ability evaluation. The process assessment mainly includes class speech, homework, class performance, etc. In the total score of the course, the final examination score accounts for 50%, the score of relevant experimental operation accounts for 20%, the CDIO course and usual homework and attendance account for 20%, and the stage in class examination accounts for 10%. Reasonable assessment and evaluation of the whole process can effectively reduce and avoid students' surprise learning of knowledge points that they cannot master before taking the exam, and ensure that students can continue to learn throughout the semester.

### **2.2 Teaching combined with multimedia means to improve students' interest in learning**

Multimedia technology is an indispensable medium in the process of modern education. According to the characteristics of chemistry courses, there are many abstract and complex chemical principles and concepts in the basic teaching process. Relying solely on slides is no way for students to visualize chemical principles and concepts and master knowledge points through imagination, and many students' thinking cannot keep up with the rapid switching of various forms of slides. However, at present, network resources and animation software are very rich. Teachers can

intuitively and concretely introduce obscure basic concepts and principles to all students through their own simulation animation or courseware, in order to achieve great success in limited classroom teaching time, enhance students' interest in learning educational knowledge and improve teaching efficiency.

For example, before class, teachers can provide preview for students through relevant multimedia technical means, master students' preview situation, and select appropriate topics according to the preview situation. Teachers can also publish relevant questions in class and let students answer on site or discuss and answer with students. After answering, the students will explain their answers to the teacher or the teacher will explain the wrong views of most students. After class, the teacher will push the questions and answers presented in class to the students for comprehensive review by the students themselves. Through the rational use of multimedia technology, teachers can grasp each student's needs and learning status in real time in the classroom, carry out personalized teaching, and improve the teaching effect, so as to enhance the students' learning motivation and enthusiasm, and make the atmosphere of classroom discussion more intense.

### 2.3 Innovating teaching methods and improving teaching quality

In the educational practice of basic courses of college engineering chemistry, heuristic, thematic, comparative, communicative and interactive teachings are often used. Teachers can choose flexible teaching modes according to their own teaching contents, so as to mobilize students' autonomy and learning interest. Through innovative teaching methods, teachers can better cultivate students' ability to use chemical knowledge to solve practical engineering problems, activate the atmosphere of classroom knowledge learning, and enhance the interaction between teachers and students, so that teachers can get the feedback of teaching effect in time, and better improve the teaching quality.

For example, in recent years, the "heuristic" curriculum design model emerging in the teaching of colleges and universities in China helps to improve the communication and interaction between teachers and students in colleges and universities. Such a teaching method can promote students to gradually change from passive learning of knowledge to active learning of knowledge, and improve their initiative. In addition, in the current teaching, "flipped classroom" is also a relatively innovative and popular teaching method. Teachers mainly refine the course content, refine independent knowledge points, and guide students to have group discussions, so as to help group students actively master relevant knowledge. This new teaching mode has completely broken through our traditional teaching methods, allowing students to use advanced electronic equipment to present their prepared contents to other students. In the second half of the course, teachers should supplement the contents that students cannot understand, summarize and reflect after class, and modify the explanation of knowledge context to ensure the integrity of knowledge system.

## 3. Conclusion

Under the background of the rapid development of material science, the basic course of engineering chemistry should keep pace with the times and constantly reform the teaching contents and methods to adapt to the new situation. Based on the professional characteristics and current situation of the basic course of Engineering Chemistry, the teaching reform of the basic course of engineering chemistry is explored and discussed. Only by carefully improving and studying the specific teaching contents and methods of the basic course of Engineering Chemistry, formulating a set of teaching methods suitable for the development of Chinese students, further mobilizing students' own learning enthusiasm and improving teaching quality, can we comply with the trend of emerging industries and adapt to the changes and development of the new economy, so as to cultivate real applied talents who adapt to the changes of the new economic era.

## References

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