

Teaching Reform of Inorganic Chemistry Course in Chemistry Normal Major Under the Background of China's New College Entrance Examination

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Abstract: In the context of the new college entrance examination, inorganic chemistry teaching faces problems such as complex learning situations, unsuitable learning resources, and single evaluation methods. Through classroom teaching reform, new teaching models, teaching resources, and evaluation systems are constructed to improve teaching effectiveness. **Keywords:** China's college entrance examination reform; Inorganic chemistry; *Normal students of Chemistry major*.

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1. Introduction

In September 2014, the State Council issued the "Implementation Opinions on Deepening the Reform of the Examination and Enrollment System". Under this guidance, Shandong Province began implementing a new college entrance examination system in 2020, no longer dividing the subjects into humanities and sciences, but changing to the "3+3" model. The total score of candidates participating in the college entrance examination is composed of 150 points each for Chinese, mathematics, and foreign languages, and 100 points each for three elective subjects. The reform of the new college entrance examination system will inevitably have a corresponding impact on teaching and learning in the university stage.

Inorganic chemistry is the first professional basic course for students majoring in chemistry teacher education to start studying in university. It is also closely related to the content learned in high school chemistry. How to balance the stage and continuity of students' knowledge development, ensure the effective connection between high school knowledge and university content under the new college entrance examination system, and improve the quality of talent cultivation in teacher education is a problem that current inorganic chemistry teachers in higher education institutions need to deeply consider and solve.

2. The main problems in current inorganic chemistry teaching

2.1 Under the new college entrance examination, students' learning situation is complicated, students' level is uneven, and basic knowledge is weak

Due to factors such as geography, economy, and basic conditions, there is a serious imbalance in the distribution of educational resources in different regions and schools. As a high school chemistry teaching subject, there are significant differences in terms of teacher strength, educational technology, experimental equipment, experimental conditions, and other aspects. In this educational context, students' access to resources and educational opportunities forms a significant difference. Therefore, students who also choose chemistry as a subject for the college entrance examination have significant differences in their thinking and hands-on abilities. As a local undergraduate college, some students did not even choose chemistry as the subject of the college entrance examination, but

applied to the Chemistry Department, which leads to weak basic knowledge of chemistry and uneven levels of students.

2.2 The applicability of inorganic chemistry teaching resources is poor, which cannot meet the needs of students' autonomous learning

At present, there are many online inorganic chemistry teaching resources, but these resources are complex. Some may be suitable for other versions of textbooks, while others may be suitable for students with solid basic knowledge, which may not necessarily be suitable for local university students. When students use these resources, they may find that they do not match their own teaching materials, or they cannot learn through online learning, and the practice questions do not correspond, which affects their enthusiasm for learning.

2.3 The problem of single evaluation methods and insufficient process assessment

The ultimate goal of inorganic chemistry teaching evaluation is to urge students to learn and improve teaching quality. The evaluation system is a powerful tool for inorganic chemistry teaching. The current evaluation methods are relatively single, with a focus on results over processes. In order to achieve high-quality teaching objectives, it is necessary to reasonably plan the teaching process and accurately create a scientific and reasonable evaluation system.

Under the guidance of new teaching concepts, we have sorted out the high school chemistry teaching situation under the background of the new college entrance examination and found that students currently have problems such as uneven chemical knowledge and insufficient learning and practical abilities. Based on student-centered and student-centered development, we should clearly change the traditional teaching methods.

3. Main Countermeasures for the Reform of Inorganic Chemistry Teaching

3.1 Constructing an inorganic chemistry teaching model that integrates online and offline teaching

In response to existing textbooks, the teaching syllabus has been improved, lesson plans have been developed, and more practical skills training sessions have been added. We choose suitable content in inorganic chemistry, adopt a flipped classroom approach, and use a task driven approach to allow students to watch videos for learning. Then, the teacher summarizes and organizes the students' completion situation, and teachers and students jointly explore and study various existing problems in class to achieve the learning goal. Presenting knowledge in the classroom through problem-solving is also a process of internalizing knowledge. This approach enhances teacher-student interaction, solves problems that are lacking in class, adapts to students' differences, stimulates learning enthusiasm, and emphasizes students' subjectivity.

3.2 Building Inorganic Chemistry Teaching Resources Suitable for Our School's Chemistry Teachers' Majors

In order to cooperate with students' extracurricular time for online self-directed learning, we further improve the existing inorganic chemistry online course on the Super Star Learning Platform, update and improve the course and teaching resources, and further match the teaching materials used. Teachers update materials such as courseware, exercises, and simulated test questions used by students for learning, and present them to students through various forms such as digital textbooks, multimedia courseware, and MOOCO videos to meet the new requirements of students' online and offline blended learning. We create a multi-dimensional and effective teaching model through online learning spaces for students to learn, exchange, evaluate, and provide feedback.

3.3 Creating a New Evaluation System for Inorganic Chemistry Teaching

In order to stimulate students' learning autonomy and improve their practical abilities more efficiently, teachers should provide a diversified evaluation system, pay attention to students' process based training, and test the learning effect through in class performance, homework, lesson plan design, daily tests, group discussions, practical reports, and other forms.

4. Implementation of Reform

4.1 Inorganic chemistry teaching reform has optimized classroom teaching content

Inorganic chemistry courses play a connecting role in the learning of various chemical majors. Therefore, it is necessary to focus on the characteristics of inorganic chemistry courses and chemistry majors, align with the ability needs of chemistry teachers, align with the training objectives of chemistry professionals, and optimize the course content; Efforts should be made to integrate cutting-edge achievements, curriculum ideological and political education, and teacher research into classroom teaching, and appropriate modifications and additions should be made to the teaching content of the curriculum.

4.2 The reform of inorganic chemistry teaching has improved the course platform, provided online learning resources, and reformed classroom teaching methods

We have built a Super Star Learning Inorganic Chemistry A course platform, recording the content of each class into a 10-20 minute short video, using questions to create MOOCs. Each class solves a problem, and sets up supporting exercises, simulation questions, etc. on the website to facilitate students' online preview and review.

Adopting various teaching methods such as blended learning, flipped classroom, and PBL (problem-based teaching method) to reform classroom teaching. For example, the process of interactive solutions based on problem-based teaching methods is: grouping (in groups of 5 people) → discussing (in class or extracurricular) → communicating (as group representatives) → summarizing (as teachers). Before the activity starts, the teacher should introduce the general methods for accessing and screening books and materials to students, and also provide specific goals and requirements for communication and discussion. Each group determines several learning knowledge blocks, and based on self-study by group members (reviewing textbooks and collecting materials online), discussions and exchanges are conducted within the group. Knowledge points are systematized through analysis and induction, and finally, the teacher summarizes and grids the knowledge points.

4.3 Inorganic chemistry teaching reform has updated evaluation methods

The teaching of inorganic chemistry has adopted a new assessment and evaluation method: (1) 50% of the usual grades (including 5% of classroom performance+10% of homework+10% of mid-term exams+15% of chapter quizzes+10% of non iconic answer assessments), and (2) 50% of the final exams are conducted in a closed book manner.

Inorganic chemistry teaching has assessed online self-directed learning, extracurricular extended learning, in class learning, theoretical assessment, and established clear assessment standards. On this basis, encourage students to explore and innovate based on the curriculum, serve society, and include the corresponding achievements, rewards, and social reactions that students have achieved based on the curriculum innovation in the curriculum assessment.

Through the final survey questionnaire, it was found that about 6% of students have achieved complete mastery of basic knowledge, about 48% are good, about 42% are average, and about 4% are poor.

5. Conclusion

The reform of inorganic chemistry classroom teaching fully reflects the student-centered teaching philosophy, which is conducive to comprehensively and systematically improving the professional knowledge level and teaching practice ability of normal school students, and cultivating and transporting qualified teachers for middle schools; It is conducive to updating existing educational and teaching resources, enriching online training content, providing students with various platforms for practice and interaction, improving their learning modes and methods, and enhancing their professional level.

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