

Research on Hybrid Teaching Mode under the background of Ideological and Political Education -- taking inorganic and analytical chemistry as an example

Yuanyuan Du, Ying Fu, Xing Gao, Li Han, Hui Wang, Ruixue Wang

Qilu Institute of Technology, Jinan Shandong, 250200

Abstract: Taking the course of inorganic and analytical chemistry as an example, aiming at the problem of “more content and less class hours” in the course, this paper puts forward specific reform plans from four aspects: the reorganization of course content and the construction of online teaching resources, the implementation of teaching organization, the integration of online and offline hybrid teaching and curriculum ideological and political, and the construction of diversified evaluation system. The course is student-centered and application-oriented, and implements hierarchical and advanced teaching. At the same time, the course explores the ideological and political elements to realize the education based on the course, and realize the internalization of students’ knowledge and the improvement of students’ ability. After the curriculum reform, students’ evaluation of the implementation effect of the curriculum is high, and students’ learning initiative and enthusiasm to participate in the classroom are significantly improved.

Key words: Blended teaching; Inorganic and analytical chemistry; Curriculum ideological and Political Education

Inorganic and analytical chemistry is a professional basic course for chemical engineering, bioengineering and biomedicine majors. This course is mainly opened for freshmen. The course content is basic, theoretical and wide-ranging, but the knowledge points of the course are scattered, the theory is obscure and difficult to understand, and the formula and process required for calculation are cumbersome. At the same time, students’ mastery of key and difficult knowledge is not solid, and their comprehensive application ability is poor; Traditional teaching methods are single, teachers and students lack communication and interaction, and fail to fully reflect the student-centered OBE education concept; In addition, the course assessment method is relatively simple, lacking the process evaluation of students’ learning, ignoring the assessment of students’ cognitive process and practical application ability.

In order to improve the quality of teaching and students’ learning initiative and enthusiasm, the teachers of the course team strive to optimize teaching resources, rely on the activities of the teaching and Research Office, actively communicate and improve the teaching design. Here, the specific practice of online and offline hybrid teaching is shared with inorganic and analytical chemistry course as an example from four aspects: course content reorganization and online teaching resource construction, teaching organization and implementation, online and offline hybrid teaching and course Ideological and political integration, and the construction of diversified evaluation system.

1. Course content reorganization and online teaching resources construction

According to the application-oriented orientation of the school, combined with the course objectives, and combined with the characteristics of students’ cognitive and psychological development, the course content is reshaped. The course content is divided into four modules: basic principles of chemical reaction, material structure, chemical analysis and instrumental analysis. The basic principle of chemical reaction focuses on the occurrence of chemical reaction and the basic laws of energy, degree and rate; Material structure focuses on atomic structure, molecular structure and coordination compounds; Based on the basic knowledge of the basic laws of chemical reaction and the theoretical basis of material structure, the four major equilibria of inorganic chemistry and the corresponding four titration analysis methods are introduced; Finally, combined with modern instrumental analysis methods, further deepen the teaching content. The course content strengthens the theoretical basis, highlights practice, focuses on quality and faces innovation. The course closely follows the development of the times, timely integrates into the latest academic frontier of chemistry, organically integrates theory with the latest practical achievements, and improves the innovation of content; At the same time, the integration of industry and university will introduce hot and difficult issues as well as interdisciplinary and comprehensive issues in the development of the current chemical industry to improve the challenge of the content.

Inorganic and analytical chemistry has 48 class hours in total. In order to solve the problem of “more content and less class hours” and help students better understand and master the relevant knowledge points, the knowledge points to be taught by the teacher are fragmented and sorted, and the teaching video is carefully produced based on the knowledge points and the corresponding teaching methods. And around the video content, the production of supporting chapter test questions and unit test questions. At the same time, in order to expand students’ horizons, data in the form of video, audio, documents and other forms related to knowledge points are collected through various channels and uploaded to the superstar learning platform as materials for students’ autonomous learning. At present, the existing teaching resources of the learning platform include pre class guidance, teaching videos, teaching plans, courseware, tests, expansion materials, popular science videos and other contents, The diversification of teaching resources provides favorable conditions for the effective integration of online and offline teaching.

2. Teaching organization and Implementation

The teaching of inorganic and analytical chemistry adheres to the student-centered principle, integrates the two teaching modes of “boppps+ flipped classroom”, highlights the three teaching links of “independent inquiry before class, participation and interaction in class, and consolidation

and improvement after class”, and creates four potential classes of “basic class, online class, discussion class, and practice class” .

1. independent inquiry before class

Before class, the teacher issued a learning task list to the students. The students made clear the schedule of the course. They learned the knowledge points according to their basic knowledge and learning ability combined with SPOC resources. All the questions set in the video were carefully answered. The difficult questions were discussed in the discussion area. The teacher supervised the students’ progress in learning the video and their grasp of the knowledge points, and adjusted the classroom teaching strategies in time.

2. participation and interaction in class

Before the formal class, students should take photos (taking textbooks, notebooks, pens) to sign in to enhance the sense of classroom ceremony and prepare for class. In the class, live broadcast and exchange discussions are mainly carried out based on “offline classroom + superstar, flat and three terminals” to strengthen the internalization of knowledge. The teacher adopts task driven, independent inquiry, discussion and participatory teaching methods to strengthen the understanding of the key points and difficulties. At the same time, he makes full use of various interesting and vivid cases to explain knowledge, and combines theory with practice to stimulate students’ interest in learning. For example, explain the dissolution balance of precipitation, introduce the generation and prevention of dental caries, and help students form a healthy lifestyle; When explaining the atomic structure, introduce the deeds of Dalton, Johnson, bohr and others, so that students can understand that they should dare to question, and establish correct scientific views and values through continuous learning. In the classroom, students’ enthusiasm and initiative in learning can be improved through the activities of group reporting, question answering, answering, and voting questionnaires. In order to monitor the students’ learning effect, the students explain and answer the quiz questions in class, and the teacher supplements them. Then, the students upload their learning notes within the specified time.

3. after class development

Through chapter exercises and cutting-edge literature, students can complete self-test, self inspection and effective expansion to achieve high-level promotion. After the completion of unit and module learning, students complete the mind map and reflect on their learning gains, so as to plan for the next stage of learning; Teachers understand students’ feedback information through questionnaires and adjust teaching design accordingly. After the completion of unit and module learning, the students complete the mind map and reflect on their learning gains, so as to plan for the next stage of learning.

Before class, teachers guide students’ Online Autonomous Learning to master low-level knowledge; In the course, the task driven method, teaching method and problem inquiry teaching method are adopted. The students carry out inquiry learning, group discussion and achievement display. The teachers give intensive lectures on the key and difficult contents, and timely introduce ideological and political elements to promote the internalization of knowledge; After class, through chapter exercises and cutting-edge literature, students can complete self-test, self inspection and effective expansion to achieve high-level promotion.

The teaching implementation process includes pre class learning, in class guidance and analysis, after-class guidance and expansion. The implementation of classroom activities mainly includes classroom guidance and questioning, autonomous problem solving, group discussion and display of results, teaching evaluation and feedback. Through the reorganization of the teaching process of the course, the inherent process of traditional classroom teaching has been broken. The mode of knowledge transfer in classroom teaching has changed, the roles of teachers and students have changed, students have changed from passive thinking to active thinking, and the classroom has changed from knowledge classroom to ability classroom .

By improving traditional teaching methods, teachers present complete teaching contents to students in classroom teaching with limited time, so that teachers’ leading role can be better played, students’ learning is more proactive and exploratory, and teacher-student interaction is more flexible and active.

3. Online and offline education and teaching and ideological and political integration of curriculum

In recent years, the Ministry of education has successively issued a series of documents, requiring the ideological and political construction of courses as the key link to implement the fundamental task of Building Morality and cultivating people, and comprehensively deployed the ideological and political construction of courses to further promote the ideological and political reform of university courses.

The essence of education is to educate people. For the cultivation of students, value creation, ability training and knowledge teaching are indispensable. The fundamental problem of education is what kind of person to cultivate, how to cultivate and for whom to cultivate. The fundamental task of Building Morality and cultivating people must be carried out throughout the whole process of classroom teaching.

In the teaching of inorganic and analytical chemistry, teachers also pay attention to Integrating Ideological and political elements into classroom teaching, such as edifying and cultivating students’ scientific spirit, feelings of family and country, health consciousness and so on, so as to give full play to the educational function of professional courses. For example, in the oxidation-reduction titration method, aspirin, the medicine of the century, is integrated to cultivate students’ courage to pursue the truth; When explaining the theory of chemical reaction rate, the deeds of Professor Qian Yitai can be integrated to encourage students to study hard, pursue truth and serve the motherland ; When explaining effective figures, the story of liwanjun, a craftsman from a large country, can be integrated to help students establish a correct outlook on career selection and employment. The course fully excavates the resources of Ideological and political education, integrates ideological and political education into teaching design, excavates the value leading function of the course, and strives to “moisten things silently”.

4. Construction of diversified evaluation system

The total score of this course is 100 points, which is composed of process assessment (40%) and final assessment (60%). The

summative assessment is reflected by the final examination results. The process assessment is composed of online and offline scores. The online scores include online learning (10%), course interaction (10%), chapter tests (15%), and student reports (15%). The offline scores are composed of offline assignments (10%), midterm exams (20%), and course papers (20%). through the use of diversified evaluation system, students' scores are evaluated in multiple directions and layers.

5. Summary and reflection

According to the training needs of new engineering talents, this course has established a wealth of online and offline teaching resources. Through multi-dimensional and interactive teaching, it reflects the student-centered teaching concept and effectively improves learning interest and learning ability. This course focuses on the organic integration of chemical knowledge points with chemical engineering and bioengineering related professional content to improve students' ability to comprehensively use knowledge to solve complex practical problems. It pays attention to the integration of science and education and innovation, integrates teachers' scientific research and teaching, and stimulates students' enthusiasm to challenge high-level topics and the spirit of innovation, which is widely welcomed and recognized by students.

In order to meet the needs of the teaching situation in the new era, teachers must invest more time and energy, carefully collect open and innovative course materials, design diversified and innovative teaching forms according to the personality characteristics of college students in the new era, stimulate students' interest in learning, cultivate students' autonomous learning ability and innovation ability, and make students truly adapt to the new era .

The teaching innovation reform of inorganic and analytical chemistry has been explored for more than three years. Adhering to the concept of "student-centered, teacher led, and continuous improvement", it uses the three-dimensional and multi-dimensional curriculum system design, the implementation of the "three-dimensional integrated" learning advanced mode, and the curriculum evaluation mechanism with students' participation to meet the high-level requirements of public basic courses under general education, Providing reliable theoretical basis and practical experience for creating the "gender once" golden class.

In the future teaching, the course construction of inorganic and analytical chemistry will continue to enrich the digital teaching resources in the network teaching platform, continue to strengthen the construction of multi-dimensional ideological and political case base, and strive to form a closed-loop teaching mode of online and offline ideological and political integration.

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