Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.13, No.15, 2022

Exploration of Teaching Reform of "Fine Organic Synthesis" Based on the Concept of OBE

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Abstract
"Outcome-Based education" (Abbreviated as OBE) is the basic philosophy followed by engineering education certification. Taking "fine organic synthesis" as an example, this paper discusses the reform measures of the course under the OBE teaching mode from the aspects of teaching content, classroom teaching mode, practical training teaching, and evaluation system to cultivate professional application-oriented talents with strong operation ability and solid theoretical knowledge.
Keywords: Fine organic synthesis; Outcome-Based education; pedagogical reform
DOI: 10.7176/JEP/13-15-08
Publication date: May 31st 2022

"Outcome-Based education" is the teaching concept of designing the teaching implementation process with the goal of educational output, paying attention to the analysis of student learning output, and designing the educational structure and evaluation system of students in reverse, so as to effectively improve the quality of teaching, and its implementation principles are "student-centered", "goal-oriented" and "continuous improvement"[1-3]. The change in the core of the educational concept brought about by the OBE is to completely abandon the previous teacher-centered curriculum system construction method, and to comprehensively construct the curriculum system and carry out teaching design based on the indicators that students need to achieve in graduation knowledge, ability and quality [4-6].

The Fine Organic Synthesis Course is a compulsory course for four-year undergraduate students majoring in applied chemistry, which mainly teaches the basics of fine organic synthesis, halogenation, sulfonation and sulfation, nitrification and nitrosation, reduction, oxidation and so on. Through the study of this course, students can establish a correct learning attitude, have a more comprehensive and systematic understanding of the basic content of the unit operation method and type of fine organic synthesis, initially master the learning of scientific thinking methods and research methods, and cultivate the ability to independently acquire knowledge. This plays an important role in broadening ideas, stimulating the spirit of exploration and innovation, enhancing adaptability, and improving humanistic quality. Through the study of the course, students can grasp some important unit reactions of fine organic synthesis more comprehensively and systematically and cultivate students' scientific attitude of seeking truth from facts. Through the study of the course, students have a certain ability to analyze and deal with practical problems in organic synthesis. In order to cultivate students to become high-quality application-oriented talents who adapt to social development, this paper will explore the implementation and application of the OBE concept in the teaching of fine organic synthesis unit response.

1. Extension of the teaching content

In the teaching process of traditional "Fine Organic Synthesis", the content involves the basic theory of fine organic synthesis, the reaction characteristics, reaction process, influencing factors and production examples of 14 types of unit reactions such as halogenation, sulfonation and sulfurization, nitrification and nitrosation, reduction, oxidation, etc. The knowledge system is very scattered and large, and students generally reflect that the learning process is boring and tedious, and there is not much introduction to new technologies and new theories. In order to solve the above problems, new technologies should be integrated into classroom teaching, and the introduction of professional and technical knowledge should be combined with the solution of social problems. In the teaching process, teachers should first change the traditional teaching habit of "seeking more and seeking perfection", streamline the teaching content, highlight the difficult points, and appropriately increase the application of nanotechnology, atomic catalysis technology, biotechnology, optoelectronic technology and green synthesis technology in the field of fine organic synthesis production, and guide students to pay attention to the latest scientific and technological frontiers. Then, the transfer of subject technical knowledge is combined with engineering certification, and the "engineering and social" abilities of students are combined.

2. Interactive classroom instruction to increase student engagement

In the traditional classroom, the main knowledge points taught by the lecturer are basically full of classes, and the students are basically in a passive state of acceptance of the whole class, and the knowledge points mastered

by the students are very few. The "Fine Organic Synthesis" Course is offered in the third year of university, and students already have a certain degree of professional knowledge and literacy. In the teaching process, teachers should design the teaching process based on the additive education teaching mode of guidance and interaction, flexibly choose teaching methods such as heuristic guidance, project inquiry, group discussion, problem-oriented, etc., and use interactive links such as classroom questions, teacher-student discussions, and teachers' answers to improve students' enthusiasm, make full use of students' existing knowledge and experience to actively learn new knowledge, provide students with opportunities for free expression, questioning, inquiry, and discussion of problems, so that students can deepen their understanding and mastery of knowledge in independent learning. Teachers can use the products of local chemical enterprises as target products, from raw material selection, pretreatment to synthetic route selection, and then from equipment selection, process design to product separation, guide students to discuss in groups, put forward personal insights, conduct in-depth exchanges, screen out more reasonable synthetic routes and production processes to enhance the students' enthusiasm, learning interest, and better learning effect.

3 Strengthening practical training and teaching

Taking a fine chemical as the carrier and simulating the production process of the enterprise, the deep learning ability of students are cultivated and improved to analyze and solve problems through the basic theory and basic method training, so that graduates can calmly cope with new knowledge, new methods or new technologies. Using the teaching teacher's corporate cooperation project as the carrier, the tasks and goals are clarified, and students are allowed to consult the relevant literature and propose solutions. Students take the initiative to consult the relevant literature to have a deeper understanding of the relevant knowledge. Learning to do training, discovering problems, analyzing and discussing problems, solving problems, improving experiments and other teaching links can better train students' vocational ability, cultivate students' professional quality to let students know how to do it, and also know why they do it, know why it is so, and then better and faster to adapt to the needs of the operating post. At the same time, we cooperate with enterprises to build on-campus micro-factories with local characteristics, and set up fine chemical production workshops in laboratories that can carry out small tests. Under the guidance of enterprise personnel, students are allowed to make one or two chemicals, and participate in the testing of product performance and process optimization. In this process, students cultivate their sense of innovation, engineering practice ability and teamwork spirit, laying a solid foundation for them to engage in scientific research or enterprise production in the future.

4. Constructing an evaluation system for learning outcomes

The focus of the OBE teaching evaluation system is the learning outcome, so a variety of evaluation criteria should be adopted to examine whether students have achieved the teaching goals from multiple angles, and the content of the examination should focus on the students' ability to apply knowledge, and minimize the examination of memory knowledge. According to the characteristics of the course of "Fine Organic Synthesis", it is recommended that the assessment be divided into three parts: usual, practical and final examination. Usually usual assessment use the usual homework, class notes, unit tests and other forms; practice assessment uses the form of special reports; at the end of the semester, final assessment adopts the form of final essays, etc., and the score record adopts a percentage system: 40% of the usual, 60% at the end of the period, and finally the grade system. The final essay is comprehensively judged from the aspects of whether the content of the paper is comprehensive, whether the language expression is accurate, whether the writing format is standardized, and so on. The practical special report is mainly for the preparation of a fine chemical designed by the students themselves through the comprehensive consideration of whether the raw materials are cheap and easy to obtain, whether the process conditions are feasible and other factors to determine the best synthesis method in order to guide students to truly apply what they have learned, and effectively cultivate students' application skills. Additional points are given to the outstanding students recommended by each group to motivate students to complete the practice report carefully. Through the above comprehensive assessment methods, the learning effect is comprehensively evaluated by the process of diversified evaluation, and the students are guided to pay attention to the process learning and ability improvement. Based on the assessment effect and feedback and the weak links mastered by the students, the education and teaching methods are timely improved so as to achieve the continuous improvement of the teaching effect and continuously improve the quality of engineering talents.

5. Conclusion

Guided by the OBE concept, the teaching team carried out a teaching reform for the course "Fine Organic Synthesis". It realizes the closed-loop teaching design based on OBE concept, strengthens the students' deep participation in teaching, pays attention to experimental practical teaching, and relies on the micro-factory on campus to improve the students' team awareness, innovation and engineering practice ability. At the same time, it pays attention to the process assessment of students, establishes a diversified assessment mechanism, and

continuously improves the teaching according to the evaluation results, so as to serve the realization of the training goals of the applied chemistry major.

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