

Exploration and Practice of First Class Chemistry Specialty Construction

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Abstract

Paris Curie College of chemical engineering, Beijing University of chemical technology, adheres to the principle of morality and talent cultivation, devotes itself to the best undergraduate education of chemistry. After ten years of hard work, it has carried out the practice of first-class undergraduate education in Sichuan University from the aspects of curriculum ideology and politics, teaching system, classroom teaching reform, integration of science and education, textbook construction and international education, We should be realistic and pragmatic, and cultivate outstanding chemical talents and leading talents with outstanding chemical wisdom, chemical perception, chemical vision and distinct brand of Sichuan University.

Keywords

Curriculum Construction; Specialty Construction; First Class Chemistry Major; Talent Cultivation.

1. Introduction

specialty is the basic unit and basic platform of talent training, and is the "four beams and eight pillars" for building first-class undergraduate course and cultivating first-class talents. Paris Curie College of chemical engineering of Beijing University of chemical technology aims to cultivate first-class talents, and takes morality and talent cultivation as the foundation. Based on the discipline characteristics and advantages, combined with the construction opportunity of "double first-class" and "innovation and entrepreneurship experimental center", it cultivates high-level top-notch innovative talents with outstanding chemical wisdom, chemical perception, chemical vision and distinct brand of Sichuan University.

2. Establish morality and cultivate people, and build the model course of "curriculum ideological and political"

Ideological and political course is the key course to implement the fundamental task of moral education, and its role cannot be replaced. The ideological and political construction of curriculum is an important content of the current professional curriculum teaching reform. Focusing on the implementation of the fundamental task of moral education and the original mission of educating people for the party and the country, Curie College of engineers in Paris has made great efforts to integrate the socialist core values into all levels, categories and the whole process of curriculum construction and personnel training, and guide teachers and students to be firm believers, active communicators and model practitioners of socialist core values, Combining ideological and political elements with professional knowledge, a curriculum group of "curriculum ideological and political model" centered on core basic courses of chemistry specialty was established, covering 19 courses and 97 courses. Through a vivid case to activate the professional classroom, green chemistry classroom in the teaching of effective use of resources, the introduction of General Secretary Xi Jinping on energy strategy "four revolutions, one cooperation" important exposition, stimulate college students' patriotic enthusiasm and national self-esteem, internalize the spirit of patriotism into a driving force. At the same time, teachers should give full play to their exemplary role, moisten things silently, and guide students to practice the concept of "green waters and green mountains are golden mountains and silver mountains".

3. Make clear the goal of talent training and build a first-class curriculum system

The overall plan for promoting the construction of world-class universities and first-class disciplines issued by the State Council clearly points out that "training top-notch innovative talents" is one of the important tasks of double first-class universities and disciplines construction [2], and one of the key points of cultivating innovative talents is the training mode. Curie College of engineers in Paris takes chemistry as its major enrollment and takes top-notch class as an example to form a echelon undergraduate innovative talent training system of top-notch class base class chemistry (Chemistry/ Applied Chemistry). After 2 years of general education, students will choose chemistry/ Applied Chemistry major voluntarily in the second semester of sophomore. In 2020, we will add a strong foundation plan for the continuous training of master's and doctoral students, which will provide reserve talents for major national strategic fields and promote the construction of first-class undergraduate majors.

The curriculum system of Curie Institute of Engineering in Paris fully implements the national standard for undergraduate teaching quality of chemistry majors, and focuses on the cultivation of first-class talents and marks the brand of Sichuan University in order to adapt to the future development trend of society and demand for talents. In the professional compulsory curriculum system, in addition to solid four basic chemical knowledge, "green chemistry", "modern synthetic chemistry" and "Introduction to polymer science" are determined as compulsory courses to form students' knowledge system for sustainable development of human society in the future, and "chemical information" and "radiochemistry" are defined as characteristic courses, and "comprehensive experimental development training" is strengthened, Open the secondary discipline in-depth elective courses, basic disciplines cross integration courses, for the future graduate stage to lay the discipline foundation. The teaching plan of experimental class base class chemistry (Chemistry / Applied Chemistry) has been improved. Students' initiative and selectivity have been brought into full play, and their practical ability and experimental skills have been trained. On the premise of laying a solid foundation, students' individualized development is encouraged.

The levels and gradients of curriculum are increased, and the classroom teaching reform is actively promoted: the curriculum team system is implemented for compulsory courses, and the course leaders are held by professors with strong sense of responsibility, dedication to teaching and caring for students, the team teachers are combined with the old, middle-aged and young, the course content is professional, and the teaching form is dynamic. Various teaching research and teaching reform activities are actively carried out, and the teaching and research activities in the new semester and the teaching discussion system twice a month are adhered to; Try various online and offline teaching methods, and strive to create five "golden Courses": take professional characteristic courses "green chemistry" and "radiochemistry" as breakthrough points, and build the first batch of MOOC courses of Curie Institute of engineers in Paris. In particular, two academicians Chai Zhifang and Zhao Yuliang, as well as a number of well-known experts in the industry at home and abroad, are invited to give lectures on "radiochemistry", so that students can have a preliminary understanding of the research methods and applications of radiochemistry, and further consolidate the position of Beijing University of chemical technology in China, Improve students' practical ability and innovation consciousness. Vigorously promote the curriculum reform, promote the "inquiry type small class" teaching and the whole process of academic evaluation: compulsory courses are 100% small class, and the class with a large number of individuals will implement "large class teaching, small class guidance". Pay attention to non-standard answers, process assessment, change the final examination results, introduce "discussion", "small test" and "stage self-report" in the classroom, and the usual scores account for more than 50%, which solves the problem that traditional academic evaluation "rote learning" can not effectively drive teaching and learning.

The curriculum system of Curie Institute of engineers in Paris not only benefits the students, but also frequently exchanges teaching experience with other universities in Western China. It actively

undertakes various teaching seminars, accepts visiting scholars and advanced teachers, which has played a good role in demonstrating and radiating the innovative talent training mode of brother colleges.

4. Attach importance to "process training" and promote the integration and innovation of scientific research and teaching

Mr. Qian Weichang put forward in the 1980s: "if you don't have classes, you are not a teacher; if you don't engage in scientific research, you are not a good teacher. Teaching without scientific research foundation is an education without views and soul. "Teachers engaged in scientific research can help to introduce the frontier knowledge of science and technology into the classroom, update the teaching content and improve the quality of teaching; at the same time, it also helps teachers guide students with innovative thinking methods, cultivate innovative thinking and improve students' innovative ability. Curie Institute of engineers in Paris has always adhered to the integration of scientific research into teaching, and the integration of "process training" into scientific research training, so as to promote students from passive adaptation to active seeking, thinking and solving problems in practice. The proportion of teachers with senior titles is 100%. We should explore frontier integrated teaching methods, effectively promote the five "into the classroom", and integrate the latest scientific research achievements into the teaching: academicians and other national brand talents into the classroom, teachers' scientific research achievements into the classroom, frontier disciplines dynamic into the classroom, social science and technology hot issues into the classroom, and top online education into the classroom. Combining "imparting professional knowledge" and "leading core values" in the course, we should deeply analyze and fully tap the cutting-edge elements in the course, and introduce scientific research achievements, For example, the latest research achievements, such as asymmetric catalytic synthesis (resource saving), one-step oxidation functionalization of benzene (new atomic economic reaction), organic synthesis and polymer polymerization reaction (clean solvent) with water as solvent, biomass conversion (environmental protection and renewable resource utilization) were introduced in the experimental teaching, so as to cultivate students' humanistic care, environmental protection, resource conservation and other concepts, and stimulate their interest in scientific research, Enlighten scientific research thinking.

Consolidate and coordinate the first and second classroom innovative practice activities. The coverage rate of undergraduate scientific research training reaches 100%. Based on learning and repeating the real scientific research results, the undergraduate has some innovation. Through experiencing the real research process of Frontier Science, students' scientific thinking ability, experimental ability and practical problem-solving ability are trained to improve their comprehensive quality. This paper designs a step-by-step scientific research guidance scheme based on interest guidance and personality guidance in the process of improving chemical innovation ability: for lower grade students, by inviting experts and professors from inside and outside the school to carry out various academic conferences and academic lectures, and to set up Freshmen's discussion courses, so as to enhance their professional interest, enhance their professional pride, activate their thinking, stimulate their innovative spirit, and help them understand the frontier of the discipline, To understand the research work of the Faculty of Curie College of engineers in Paris; to arrange the students to enter the research groups for scientific research and training according to the scientific research training projects provided by the research team; to arrange the students to enter the research groups for scientific research and training by means of two-way selection and deployment of Curie Institute of engineers; to receive scientific research training in the research group for senior undergraduates, In the form of scientific research team and responsible Professor, individualized training is carried out according to the specific situation of students.

To strengthen the innovation and entrepreneurship education with "creativity innovation entrepreneurship" as the core, the cross integration of basic disciplines often leads to major scientific discoveries, new ideas and new ideas, which is particularly important for the cultivation of students' innovation ability. Combined with the "green chemistry and innovative pharmacy innovation and

entrepreneurship platform" jointly constructed by Paris Curie Institute of engineers and Paris Curie Institute of medicine, Curie College of engineers in Paris cultivates the concept of "innovation and entrepreneurship" by breaking the disciplinary barriers, promoting the interdisciplinary, and activating the source innovation. Taking the construction of the software and hardware platform for mass entrepreneurship and innovation as an opportunity, we will focus on creating a street, building a comprehensive training platform for intelligent and creative chemistry and precise measurement, and a training platform for the construction and evaluation of active molecules with Curie Institute of Engineering in Paris, and carry out interdisciplinary training and exploration of the mode of mass entrepreneurship and innovation. At the same time, introduce social resources such as technology-based enterprises and venture capital institutions to guide students to fully connect with capital and market. The students won three gold awards and two provincial silver awards in the "Internet +" college students innovation and entrepreneurship competition of Sichuan Province. The "good food machine" world's first portable food safety detector was selected into the national "mass entrepreneurship, mass innovation" mass entrepreneurship and innovation week, which is the first scientific research transformation exhibition project of Beijing University of chemical technology.

5. Inherit the "chemical soul" and promote the construction of high-level teaching material system of Sichuan University

Personnel training needs many conditions, teaching material construction and curriculum construction complement each other. Curie Institute of engineers in Paris formulated the management measures for textbook construction of Paris Curie College of chemistry, Beijing University of chemical technology, which encourages teachers to carry out textbook research, compile and publish high-level and high-quality teaching materials, promote theoretical innovation and professional construction, and promote the overall improvement of teaching quality. Establish incentive and guarantee mechanism for excellent textbook compilation. The compilation of teaching materials will be included in the year-end workload assessment. The Curie Institute of engineers, Paris, gives grants and awards to the excellent students at all levels and the textbooks for national and provincial planning and construction.

6. Highlight discipline brand and promote the construction of first-class undergraduate specialty

Based on the "double first-class" disciplines, Curie College of engineers in Paris has built the discipline group of "chemistry and green chemical engineering", broken the boundary between basic research and engineering transformation, and realized the cross integration and leap forward development of traditional disciplines. Strengthen the construction of teaching and scientific research base. In 2008, it was awarded the national basic science research and teaching talent training base. In 2009, it was rated as the national top-notch talent training pilot unit and national characteristic specialty. In 2011, it was awarded the special discipline point of radiochemistry of NSFC. In 2017, it was awarded a – in the fourth round of discipline evaluation. In 2019, the chemistry specialty was selected into the first batch of national first-class undergraduate specialty construction points (Shuangwan plan), In 2020, it will be selected as the pilot unit of strong foundation program and 2.0 base of top-notch students training program in basic disciplines.

At present, Curie College of engineers in Paris has established the Collaborative Innovation Center for environment and fire safety polymer materials jointly constructed by the provincial and ministry, the national and local joint engineering laboratory for environmental protection polymer materials, the national and local joint engineering laboratory for the preparation and utilization of energy plant biofuel, the Key Laboratory of green chemistry and technology of the Ministry of Education (excellent in 2013 and 2019), and high scores of environmental friendliness. There are 14 national and provincial scientific research bases including engineering research center of Ministry of education. Discipline construction provides a strong discipline support for the talent training of Curie Institute

of engineers in Paris. National and provincial scientific research bases are important bases for students' innovative practice and provide high-quality resources for professional teaching.

7. Conclusion

Taking the construction of first-class specialty and first-class discipline as the goal, Curie College of chemical engineering of Beijing University of chemical technology has always taken moral cultivation and talent cultivation as the fundamental task. It has integrated the cultivation of national feelings, industrial ideals and academic spirit into teaching, and promoted students to become national pillars and social elites, and achieved remarkable results. We will make great efforts to build first-class undergraduate education in the future.

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