

Research on Teaching Reform of Environmental Engineering Based on Practice

Shiyong Zhao
Panzhuhua University

Abstract: With the increasing demand of society and enterprises for applied human resources, colleges and universities should actively improve the human training plan of environmental engineering majors, strengthen practical education, emphasize the cultivation of applied skills, open up new fields, and establish the training mode of applied talents in the field of environmental engineering.

Keywords: Environmental engineering; Practice teaching

DOI: 10.47297/wspiedWSP2516-250059.20220608

1. Introduction

With the development of China's economy and society, environmental problems appear in many places. For example, some areas are facing serious water pollution, others are facing air pollution, while others are facing different problems in the process of economic and social development. First of all, environmental protection needs the participation of the whole society. Second, it needs professional environmental protection talents. We should not treat the symptoms but the root causes, and should deeply study the causes of environmental pollution and formulate scientific treatment plans. Only in this way can environmental problems be completely solved, so it is very important to cultivate environmental protection talents. The major of environmental engineering is responsible for training environmental protection talents in China. It needs to understand the trend of environmental protection, to carry out in-depth practice teaching reform of environmental engineering, to improve the experimental teaching system, to keep pace with the times, and to cultivate talents more in line with the work of environmental protection for the society.

About the author: Shiyong Zhao, male, China, Han nationality, School of Biology and Chemistry Engineering College Panzhuhua University, lecturer, Doctor, Environment Engineering.

2. Content of Teaching by Environmental Engineering

(1) Professional course experiment

Professional course experiments are usually carried out in the laboratories, which intersect with theoretical education and are the understanding and digestion of theoretical knowledge of books.

(2) Cognitive practice

Organize cognitive practice, so that students can visit sewage treatment plants, waste treatment plants and so on to understand the pollutant treatment process, some treatment facilities and the working methods and methods of treatment facilities.

(3) Production practice

Organize students to the production frontier of environmental protection companies, environmental protection bureaus and design institutes. Students will help the production staff deal with some simple problems, and the production department will lead the students to learn. Production departments and employees have a very important influence on students' production practice.

(4) Course design

Course design is carried out after students have basic environmental engineering knowledge, and is usually completed under the guidance of teachers. Through course design, students can learn the most basic engineering design methods and lay a foundation for the future self-engineering design.

(5) Graduation practice

Graduation practice refers to the comprehensive practice before graduation. Graduation practice requires students to use the comprehensive professional knowledge they have learned and show their personal ability.

(6) Graduation design

Graduation design is a comprehensive summary work of students under the guidance of teachers. Graduation design project focuses on students' professional foundation, professional thinking, professional operation skills and the ability to solve problems independently.

3. Problems of Environmental Engineering Education

(1) The talent training plan needs to be improved

Environmental engineering is a new specialty. At present, many private universities generally lack characteristics in the training of environmental

engineering professionals. The basic method is to refer to the “985” or “211” talent training plan of domestic universities, but these universities are scientific research and innovation. The thinking training of senior talents is obviously inconsistent with the applied and compound talents training of private universities. At the same time, the current talent training plan is more theoretical than practical. In addition, the practical ability training course of students is the same as the environmental engineering training course of private universities, which does not highlight their own professional characteristics and disciplinary advantages, so the employment goal of graduates is less.

(2) Experimental education needs to be strengthened

At the same time, due to the limitation of experimental conditions and funds, some professional courses can only be carried out through theoretical teaching methods, while the related experimental courses can not be set up. On the other hand, the experiment course is a professional course, but most of the experiments are cognitive and confirmatory, lack of design and innovative experiments, which can not significantly improve students' ability to find and solve problems. In addition, due to the lack of laboratory equipment, it is difficult to effectively ensure the quality of laboratory training.

(3) Students' application ability needs to be improved

Improving students' application skills is the basic requirement of the transformation of private university teachers. Application skills can come from university practice. First of all, the time and content of the professional training and production practice training are unreasonable, and there is no guarantee that the practice training will run through the whole course. Secondly, the basis of practice is not stable. At present, off-campus practice bases all adopt the way of cooperation with the company. Students must join the company for field practice to improve their practical skills. The cooperative company does not get fixed income, and the cooperation between school and enterprise is difficult to carry out effectively, then students will be difficult to make a breakthrough in the content and effectiveness of internship. In addition, the lack of internship funds for each student is the main factor hindering internship practice and application skill training.

4. Discussion on the Reform of Practical Teaching of Environmental Engineering

(1) Highlighting the professional advantages of chemical engineering and giving full play to the professional characteristics in the course practice

The basic knowledge of chemical engineering is stronger than that of science and engineering, especially for pure science and engineering courses

such as “Atmospheric Physics” and “Mechanical Drawing”, They need to perform mechanical design, meteorological monitoring and other pure science and engineering courses. At the same time, there is no iteration and similarity experiment with other environmental processes, and the test site is placed in the school and the surrounding environment in combination with the professional requirements in the process experiment design. It is used to detect and treat the waste water and waste gas from the campus and the sewage outlets around the campus, and is close to practicability at zero distance. Students can independently design the square room and placement point, independently practice, evaluate and process the monitoring data, and put forward the treatment and solutions.

(2) Course plan setting and training content revision

The complete experimental teaching syllabus is the core of the course practice teaching, and it is used to clarify the purpose of experiment, set the goal, avoid blindness, and strive towards the goal. Therefore, it has been emphasized that experimental education in this subject is an essential link in the teaching of the subject, and is an important way and means for students to understand the essence of teaching. Through participating in educational experiments and practice, students can understand the reality. By combining theory and practice, they can directly contact and understand professional knowledge, improve their analysis and solve practical problems, participate in various activities, obtain technical training and master specific design skills.

The content of experimental teaching mainly focuses on the process and effect of the experiment. According to the nature of environmental engineering course, a method of combining science, industry and agriculture, theoretical knowledge and practical knowledge is adopted to deepen the actual instrument testing theory and the ratio between theory and practice. In other words, it is to use scientific theories to guide engineering practice to use agricultural theories. On the one hand, knowledge penetration engineering technology can enhance students' comprehensive practical skills, on the other hand, it can solve practical problems and avoid students' difficulty in identifying abstract theoretical knowledge. Meanwhile, for the verification of core experiments, efforts should be made to reflect the complete method specifications of the experimental contents of specific disciplines. For example, in the comprehensive experiment of the “Water Pollution Control Engineering” and “Air Pollution Control Engineering”, it includes “practical application design of wastewater treatment equipment”, “the creation of wastewater treatment equipment model” and “total dust removal design equipment and production”. For the hands-on courses, students must design their own experimental plans, prepare and execute the experiment process by themselves, and display the experimental results through physical models.

(3) Actively exploring open practice methods to improve the effect of practical teaching

Environmental engineering practice education consists of two parts: experiment and practice. Therefore, it is necessary to actively seek open practice methods in practice design to keep process learning and production going smoothly. On the one hand, during the internship, students leave the classroom, we place them in sewage treatment plants, environmental monitoring stations and other industrial, mining and grass-roots enterprises to help them understand pollution, master control technology, understand process and environmental pollution monitoring, understand the current situation of environmental pollution control and control, and understand the design and construction procedures of pollution control projects, so as to provide students with the opportunity to contact real equipment to the greatest extent. Curriculum design can not only help students analyze and solve problems, cultivate their innovation ability and cooperation spirit, but also reflect the application, development and comprehensive content, and cultivate students' comprehensive ability, engineering consciousness and simulation ability, so as to further stimulate students' interest in curriculum learning.

5. Conclusion

The practical education of environmental engineering specialty is very important, and practical education reform should be carried out to make students better adapt to the development needs of the future society. Through the introduction of on-the-job training in theoretical education, we should focus on the cultivation of practical skills, and increase practical opportunities and time through various ways. With the continuous improvement of the experimental content, the experimental training link has been optimized, the evaluation system has been improved, and the training effect has been improved. Education reform is a long-term challenge. With the development of the society and science and technology, it is necessary to carry out more in-depth experimental education reform in the future, organize education experience, explore new methods and new ways, give full play to experimental teaching ability, and make continuous innovation and efforts in the new era.

References

- [1] Mo Zhuojun. "Discussion on practice teaching reform of environmental engineering specialty" [J]. *China Electric Power Education*, 2010 (15): 106-108.
- [2] Liu Yan, Wei Qia. "Reform and practice of comprehensive design experiment teaching in environmental engineering specialty" [J]. *Experimental Technology and*

- Management*, 2007 (11): 131-33.
- [3] Li Yanqing, Guo Chunlei, et al. "Application of PBL teaching method in experimental teaching of environmental engineering speciality" [J]. *Laboratory Science*, 2012, 15 (5): 42-44.
- [4] Zhai Zhicai, Li Bin, et al. "Reform and practice of training compound enterprise environmental protection management talents in environmental engineering specialty" [J]. *China Metallurgical Education*, 2015 (11): 37-39.
- [5] Fang Yunzhang, Ding Gejian, Lin genjin. "Discussion on several experimental teaching reform problems that laboratory directors should think deeply about" [J]. *Laboratory Research and Exploration*, 2018, 27 (6): 100-102147.