

Discussion on the Reform of Practical Teaching System of Solid Waste Treatment and Disposal

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Abstract—Practice teaching is an important link in the course of "solid waste treatment and disposal", and it is the main index to achieve the goal of high-quality applied talent training, but it has not been paid due attention. This paper analyzes the current situation of practice teaching in solid waste treatment and disposal, and discusses the reform measures of the practical teaching system of this course. The status quo of solid waste practice teaching.

Keywords—Solid Waste Treatment and Disposal; Practice Teaching; Virtual Simulation

I. INTRODUCTION

Solid Waste Treatment and Disposal is one of the main courses of environmental majors in general colleges and universities in China, and one of the nine core courses of environmental engineering majors clearly stipulated in the Department of Education's Teaching Guidance Committee of Environmental Engineering in Higher Education [1]. The content of the course is cumbersome, from the collection and transportation of solid waste, solid waste of various treatment methods and processes to the final disposal of solid waste, covering a wide range of mathematics, physics, chemistry, biology, hydrogeology, machinery, cartography and other disciplines knowledge, is a comprehensive, practical and highly engineering course [2]. Practice teaching is an important link for students to understand and master subject knowledge and skills, and an important way to realize the transformation of theoretical knowledge into ability. On the one hand, practical teaching can guide students to discover problems, analyze problems, and encourage students to use the basic theoretical and practical knowledge they have learned to solve problems, and on the other hand, it can stimulate students' interest in learning, enhance students' perceptual understanding of theoretical application, and improve students' ability to innovate [3,4]. Practical teaching plays an important role in the system of solid waste teaching. And from the current situation of professional certification-oriented practical teaching, China's environmental engineering professional colleges do not pay too much attention to the students to practice teaching; Not conducive to the development of students in the future to engage in environmental engineering professional work needs of the overall situation [5]. Taking our school as an example, this paper analyzes the current situation of practice teaching of solid waste course and discusses the reform of the practical teaching system of the course.

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II. PRACTICE TEACHING OF SOLID WASTE TREATMENT AND DISPOSAL

A. Practical Teaching Resources are Seriously Insufficient

With the continuous expansion of the enrollment scale of colleges and universities, it is difficult to fully meet the teaching needs of existing practical teaching resources. We do not have an independent solid waste laboratory. We can only set up several simple solid waste experiments in combination with the courses of Environmental Monitoring, Environmental Engineering Principles, and Environmental Microbiology. The biological treatment and heat treatment of solid waste. Experiments such as land treatment have long duration and safety problems. It is difficult to operate in the laboratory, so that students can only understand the processing process through theory, and can not participate in the process themselves. The students' hands-on ability can not be exercised. It is difficult to improve the ability to practice.

B. Practice Teaching Process is More Restricted

Although our practice teaching arranges internships and production internships, the internship units are considered for safe operation. The students' internships are mainly based on visits, such as garbage incineration plants. The sand table is the best place to visit. In addition, students only see the feed and slag, but the incineration equipment and process that students really want to know can't be seen; in the landfill, the students only see the simple links of dumping, compaction and covering soil, and leachate. How to collect, how to lay the gas collection pipe, how to deal with the anti-seepage, how to develop after the closure, etc. The key points that the students need to solve the practical problems in the subsequent course design can not be seen, and they are turned around in the factory. In a circle, there is not much help in the practice of the course, making the internship in the form. The role of the internship in the development of students' practical ability is becoming weaker.

C. Practice Teaching and Course Teaching are out of Touch

Understand the internship in the second semester of the freshman year, the professional course has not yet been opened, the students do not have any professional foundation; the theoretical teaching and curriculum design of solid waste are simultaneously opened in the first semester of junior year; the production internship is in the second semester of junior

year, especially The course design is carried out directly after the completion of the course theory teaching. Without any support from the practice link, students can only design with reference to various engineering books and textbook content, which cannot fully mobilize the creativity of students. The design is like a castle in the air, which is difficult to achieve the desired effect. Such practical teaching arrangements are difficult to improve students' practical ability.

III. PRACTICAL TEACHING REFORM MEASURES

A. Targeted Arrangement Practices

At present, our internships are professional internships, for the environment related to all courses of internship, and there is no independent solid waste course internship, so we need to strengthen the relevance of internship, separate arrangements for solid waste internship, before teaching students on the solid waste collection and transportation, treatment and disposal of all links have a more detailed understanding, and then combined with classroom teaching. It can improve students' understanding and mastering of theoretical knowledge, and it is also convenient for students to complete the course design very well. In addition, the pre-internship school should actively communicate with the internship unit, in the premise of ensuring the safety of the operation of the unit, as far as possible to allow students to visit all the systems in detail, so that students have a deeper understanding of the curriculum, since the school and enterprises set up a practical teaching base, should let these practical teaching bases play the greatest practical role. In the experimental aspect, in addition to the combination of other courses, it is necessary to set up the relevant solid waste validation experiment and design experiment, in order to improve the students' hands-on ability and improve the practical skills of students. In addition, we can combine the situation of campus waste waste to carry out garbage classification and sorting experiments, do not need to occupy laboratory resources, a few simple equipment can complete the experiment, at the same time, the basic data can also provide theoretical support for the national garbage classification system.

B. Introducing Virtual Simulation Teaching

Virtual simulation experimental teaching is a new teaching mode in recent years, which is not only a supplement to the traditional teaching mode, but also a change of teaching mode. Virtual simulation practice teaching can realize the teaching function that real teaching does not have or is difficult to complete, break through the space-time limitation of operation, provide reliable, safe and economical practical teaching project, can effectively improve the efficiency and effect of practical teaching, expand the scale and time-space of practical teaching, and improve the safety of practical teaching [6]. It is the use of computer technology to build a virtual experimental operating environment and experimental objects, so that students can carry out the relevant experimental operation in the virtual environment, and get the results of the operation. Through virtual simulation technology, the process process and main structure structure of various methods of solid waste disposal and disposal can be simulated on the

computer, and students can visually observe the process of processing and disposal and the specific process characteristics. The complex structure internal structure through the three-dimensional visualization display, can let students understand the basic parameters of the structure, the detailed structure and design principles, for the students to better understand the relevant course content provides an important teaching aids. Virtual practice is not limited by time, place and scale, can be repeated anytime, anywhere, every student can get full practical opportunities to achieve large-scale teaching. In the course of virtual practice, students do not need to be exposed to various dangerous reagents, do not need to operate various equipment, do not need to go into the field to visit, not to cause major losses or cause accidents, not only to deepen students' understanding and mastering of professional knowledge, but also to improve students' innovative thinking and practical ability.

C. Practical Teaching of Teaching Teachers

Most of the teachers are directly from universities and research institutes to engage in university teachers, very few enterprise experience, have solid basic theoretical knowledge, are competent to the theory course. However, teachers also lack practical teaching, so it is necessary to carry out the necessary practical teaching training to teachers, improve the ability and level of teachers to guide practical teaching. Through cooperation with the internship unit, the experienced staff can be invited to practice teaching students, not only can change the status quo of teachers' lack of work experience, but also to a certain extent to improve students' interest in learning, in order to promote the improvement of practical teaching level.

IV. CONCLUSION

At the 14th meeting of the Central Leading Group on Finance and Economics held on December 21, 2016, General Secretary Xi Jinping explicitly called for the "advancement of the garbage classification system"; This aspect reflects the state's high attention to the treatment and disposal of solid waste, on the other hand, it also puts forward new requirements for solid waste teaching: at the same time, we must strengthen practical teaching and enhance students' practical ability. Virtual simulation technology [7-9], as a new teaching method and method, has been used in many professional teaching, and the introduction of virtual simulation technology is a positive response to the national requirements for improving the practical application ability of engineering and technical personnel, as well as the development of the solid waste treatment and disposal course itself. On the basis of reforming traditional practice teaching, solid waste practice teaching introduces virtual simulation practice teaching, continuously improves students' innovative thinking and practical ability, and achieves the goal of cultivating high-quality applied professionals with solid foundation, strong practical ability and innovative spirit.

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