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Research on Undergraduate Professional Training Mode of Safety Engineering under Multidisciplinary Crossing

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Abstract

Through the investigation, analysis and evaluation of the teaching status quo of the undergraduate courses of safety engineering in colleges and universities, on the basis of finding out the problems existing in the undergraduate professional training mode of safety engineering under the multidisciplinary intersection, the establishment of environmental and chemical engineering Interdisciplinary safety engineering undergraduate teaching mode, adjust the teaching system, broaden the teaching content, strengthen practical teaching, and enhance teaching methods. Including: 1) investigation and analysis of undergraduate teaching status of safety engineering major; 2) design of undergraduate teaching content of safety engineering major with multidisciplinary; 3) exploration of undergraduate cross-teaching mode training mode of multi-disciplinary safety engineering major; 4) The examination of the promotion teaching effect of the undergraduate teaching mode of safety engineering with multidisciplinary. The research can play a certain reference and guidance for the undergraduate education of safety engineering, and continuously meet the urgent needs of the application and research of composite engineering and scientific talents in China's mines and other fields.

Keywords

Interdisciplinary; security engineering; talent development; education reform.

1. Introduction

With the formulation and implementation of the national “13th Five-Year” development plan, the demand for safety engineering talents in the country has surged, and the talent gap will still exist in a short time [1]. At the same time, with the continuous improvement of national safety production requirements, the requirements for production technology level, equipment level and environmental protection are getting higher and higher, and the quality of safety management personnel and technicians is required to be more comprehensive in various industries [2]: Need industry talents to have a solid professional foundation, strong hands-on ability and practical ability, but also need to have a certain cross-disciplinary background and scientific research ability to adapt to the rapid development of advanced technology, master the constant introduction of technical equipment, and on this basis Work creatively [3~5]. On the other hand, the safety engineering major is a new and comprehensive discipline with strong cross-disciplinary nature. There are many lectures and tense classes [6]. At present, there is a single boring form of teaching, the content of the professor is boring and abstract, and the difficulty of understanding; the historical background of professional development is not deep. There are professional prejudice, students' enthusiasm for learning is not high; self-study ability and independent innovation level are low; professional direction is not strong [7~8], which has always been a common problem in safety engineering undergraduate education. Therefore, in recent years, many undergraduate students of safety engineering cultivated by

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colleges and universities are not well adapted to the working environment, and the pressure to explore and study at work is relatively high [9~10].

In view of this, with the goal of innovative teaching practice, we have developed a multidisciplinary and cross-cultivation model with targeted, operability and good effects, changing the way students passively accept knowledge, constructing an open learning environment and providing more Channels acquire opportunities for knowledge and applied knowledge, promote students to form positive attitudes and good learning strategies, and cultivate new talents with scientific quality and ability to adapt to disciplines for the society and employers.

2. Problems in the Training Mode of Undergraduate Professional Talents in Safety Engineering

At present, most of China's safety engineering undergraduate education is based on the idea of "great security concept", setting extensive (or focused) engineering background courses, engineering safety courses, setting up a small number of safety science methodology courses and a small number of medical and psychology courses to enable students When mastering various engineering techniques and corresponding safety technologies, learn some general knowledge of safety science, so that the main use of engineering technology, and secondary management methods to solve security problems. Due to different majors, the American security majors have different courses, whether they are basic courses or professional courses. The curriculum has a strong professional background, the industry is highly targeted, and the research direction has been divided at the undergraduate level. Even the same major, due to different research directions, the basic courses and professional courses are also quite different. It is known from the students that the students of security majors in American universities are actually engineering and technical personnel in various industries. They have certain industry technical knowledge and work experience. Therefore, the safety majors of American colleges and universities are based on the principle of less and more precise, and they are only used. A small number of technical courses, and a large number of methodological courses, supplemented by a certain proportion of medical and psychology courses, enable students to focus on the safety management knowledge of various industries. After graduation, students are mainly security management talents in various fields. Because of having certain engineering and technical knowledge, and having certain knowledge of safety management, he can smoothly go to work and be qualified for work after graduation. The shortcoming is that the employment of students is relatively narrow. When graduates are not employed in the profession of the professional field, they are limited by the knowledge of the original industry, and often cannot meet the requirements of non-self-industry for safety work. The curriculum of the safety majors in China is based on the principle of strengthening the foundation and downsizing the profession. It is based on the attributes of the comprehensive discipline of the safety discipline. The curriculum covers almost all walks of life and has a wide range of knowledge. The drawback is that the professional features are not obvious, the knowledge is not so precise, and the courses are heavy, the burden is heavy, and the basic knowledge is not solid. On the other hand, due to the limitations of the time of study, the duration of each course is limited, so that the quality of teaching is limited. China's college security majors are mainly aimed at production safety, with the training of safety technicians as the main training target. Therefore, the proportion of technical courses is large, the proportion of methodological courses is small, and the focus of curriculum is still on engineering and technology, law, psychology. There are relatively few aspects related to medicine, sociology and so on.

At this stage, there are still major differences between China's security majors and employers on the requirements of security personnel. There is a certain disconnect between market

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demand and market demand. The training of security talents often fails to meet the requirements of employers. Enterprises usually require going to work. Graduates of the position will soon be able to adapt to the work they are doing. In fact, the cultivation of higher education talents can not only consider students' comprehensive adaptability to the current society, but also consider the needs and stamina of future social development. As far as industry expertise is concerned, the knowledge of graduates of security majors is not intensive. It is difficult to cope with specific security technology problems at the beginning of work. Safety engineering graduates must continue to learn immediately after finding a job and starting a job. The main knowledge of safety engineering students studying at school is the general principles, methods and means of safety technology and management. More is the basic theory and general knowledge shared by engineering majors, and less specialized knowledge of professional (industry). It is very difficult for a company to master safety technology and management when it does not understand the production technology. Therefore, graduates must be self-study in the relevant professional courses of their own enterprises in a short period of time, and be familiar with the production and operation processes of the enterprise. Enter the role and do the work quickly.

In addition, at the level of security disciplines at present, the research and development of disciplines are relatively lagging behind, and the foundation and supporting role of disciplinary research results on professional construction is not obvious enough. The social needs of current security discipline professionals have many types, multiple levels, and multiple fields. The objective needs of talents are huge. However, the current demand for professional education in security disciplines and the number, level, knowledge structure, and capacity structure of talents for higher education in security engineering also presents many asymmetries and incompatibility.

The safety engineering majors of many colleges and universities nationwide have been newly established in recent years, and most of these schools are two and three schools, and their hardware, software and teachers are relatively weak. For example, many colleges and universities have inadequate professional teachers; the practice bases and laboratory conditions are relatively general; professional teachers are vague about the safety discipline system, the big safety concept, and the safety discipline's attributes, resulting in a variety of training programs for the safety engineering profession. The second chaos; the training objectives of the school safety engineering profession are out of line with the standards of registered safety engineers and safety appraisers.

3. Construction of Undergraduate Professional Training Mode of Safety Engineering

(1) Investigation and Analysis of the Present Situation of Undergraduate Teaching in Safety Engineering

Through the methods of literature, questionnaires, interviews, etc., the safety projects of Xiangtan University, Central South University and other provinces and China University of Mining and Technology, China University of Science and Technology, Zhejiang University, etc., especially for the current situation of Xiangtan University, evaluate the advantages and disadvantages of the teaching model. Summarize and analyze the main shortcomings of undergraduate teaching in safety engineering.

(2) Content design of undergraduate course of safety engineering major with multidisciplinary

According to the characteristics of safety engineering, combined with the characteristics of Xiangtan University in the fields of environmental science, chemical engineering, geology and minerals, etc., the subject of professional subjects such as "Safety System Engineering" and "Safety Human-Migration" Targeted teaching content optimization design and resource

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integration, introducing engineering cases for environmental, chemical, geology and minerals and other disciplines to strengthen teaching content, turning abstract and complex theoretical knowledge into actionable and practical cases. A targeted professional orientation course will be added to enrich the teaching content and update the teaching mode.

(3) Exploring the training mode of undergraduate cross-teaching mode in safety engineering with multidisciplinary

On the basis of the design of the teaching curriculum, according to the characteristics of environmental disciplines, chemical disciplines, geology and mineralogy, and other disciplines, the teaching plans and teaching steps are refined, and the multidisciplinary model is adopted to cultivate students according to their interest in learning. Exploring a set of teaching methods (or models) with strong operability and good teaching effect to enhance students' interest in learning and help guide students to explore their self-learning ability and creativity. Develop a detailed teaching and experimental plan and implement it, verify the effectiveness of teaching methods (models) and compare them with the learning situation between ordinary classes.

(4) The effect of the promotion teaching effect of undergraduate teaching mode of safety engineering major with multidisciplinary

On the basis of the preliminary work, improve the construction of interdisciplinary training mode, and gradually expand the scope of promotion and professional courses, form a good research and innovation atmosphere among students, and promote the all-round development of students. At the same time, through the use of observation methods, questionnaires and other means, continue to test, demonstrate and improve the model.

The specific content includes:

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According to the characteristics of safety engineering, combined with the characteristics of Xiangtan University in the fields of environmental science, chemical engineering, geology and minerals, etc., the subject of professional subjects such as "Safety System Engineering" and "Safety Human-Migration" Targeted teaching content optimization design and resource integration, introducing engineering cases for environmental, chemical, geology and minerals and other disciplines to strengthen teaching content, turning abstract and complex theoretical knowledge into actionable and practical cases. A targeted professional orientation course will be added to enrich the teaching content and update the teaching mode.

On the basis of the design of the teaching curriculum, according to the characteristics of environmental disciplines, chemical disciplines, geology and mineralogy, and other disciplines, the teaching plans and teaching steps are refined, and the multidisciplinary model is adopted to cultivate students according to their interest in learning. Exploring a set of teaching methods (or models) with strong operability and good teaching effect to enhance students' interest in learning and help guide students to explore their self-learning ability and creativity. Develop a detailed teaching and experimental plan and implement it, verify the effectiveness of teaching methods (models) and compare them with the learning situation between ordinary classes.

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4. Conclusion

(1) Through the investigation and analysis of the current situation of undergraduate teaching in safety engineering, demonstrate the feasibility and inevitability of deepening reform and redesigning the undergraduate course of safety engineering.

(2) Combining the characteristics of the disciplines of the safety engineering of Xiangtan University with the background of surrounding disciplines, explore the cross-teaching content and teaching methods of disciplines that are more in line with the backgrounds of environment, chemical industry, geology and minerals, and strengthen the practice of curriculum setting and teaching process. Sexuality and practicality, and verified through trial and verification, and gradually promoted.

(3) Through the implementation of this topic, improve the study enthusiasm, self-learning ability, practical ability and creative ability of the research object (student), and help students form their own learning methods and research on the subject professional basis on the basis of successfully completing the basic teaching tasks.

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