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Curriculum Reform of Disaster Prevention and Control Based on the Integration of Innovation and Entrepreneurship

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ABSTRACT

Innovative and entrepreneurial talents is the main driving force for local universities to promote the smooth development of the society, and is also a key factor in improving the employment rate of graduates. Using the example of undergraduate safety engineering students, this study analyzed the important role that the innovative and entrepreneurial talents of students play in the society development. The current problems in teaching are analyzed in terms of theoretical teaching, practical teaching, lack of practical ability of the teaching staff and assessment methods. In order to solve the above problems, this study constructed a multidisciplinary cross-fertilization teaching system in theoretical and practical teaching, and proposes a diversified evaluation method, and applying them to teaching practice with some success. To cultivate talents with innovative thinking and skills, and to provide a reference for the cultivation of high-quality applied talents in China's security engineering profession.

KEYWORDS

Innovation and entrepreneurship; Safety engineering; Practical ability; Multidisciplinary integration.

1. INTRODUCTION

China's economy has entered a new phase of development, facing challenges such as overcapacity, unsustainable resource input, and changes in the international environment. To achieve high-quality development, innovation and domestic market reliance are essential [1-2]. Over the past five years, the number of university graduates had risen from 8.34 million to 11.58 million, an increase of 38.85 percent over the previous year, as shown in Figure 1. As the cornerstone of national development, the ability of students determines the direction of the country's future development. To ensure the smooth development of our economy, the new era demands higher competence from students [3]. Therefore, the cultivation of innovation and entrepreneurship ability of talents in colleges had become a major priority of contemporary education [4].

Many colleges and universities are currently undergoing reforms in their education systems. To cultivate innovation and entrepreneurship abilities in students, theoretical education should be combined with practical teaching, specifically through the teaching aspects of dual creation. This will help students develop both their professional knowledge and practical skills in innovation and entrepreneurship [5-6]. Chen et al. proposed to build an integrated education system of industry teaching, achieve deep cooperation between schools and enterprises, develop students' innovative and entrepreneurial thinking in a comprehensive way, and jointly cultivate the innovative and entrepreneurial ability of university talents, who combining industry and curriculum [7]. Zheng et al. proposes a problem-oriented teaching model based on innovation and entrepreneurship education, and implements sub-segment teaching to establish an innovation and entrepreneurship classroom

education system, which is able to inspire students' consciousness of thinking [8]. Currently, many studies on innovation and entrepreneurship education focus on developing students' thinking and raising awareness in the classroom. However, this approach overlooks the impact of combining theory and practice on fostering innovative and entrepreneurial thinking. It is essential to fully consider the development of new entrepreneurial thinking in creative students through the integration of theory and practice, in order to enhance the innovation and entrepreneurship abilities of college students in related fields [9].

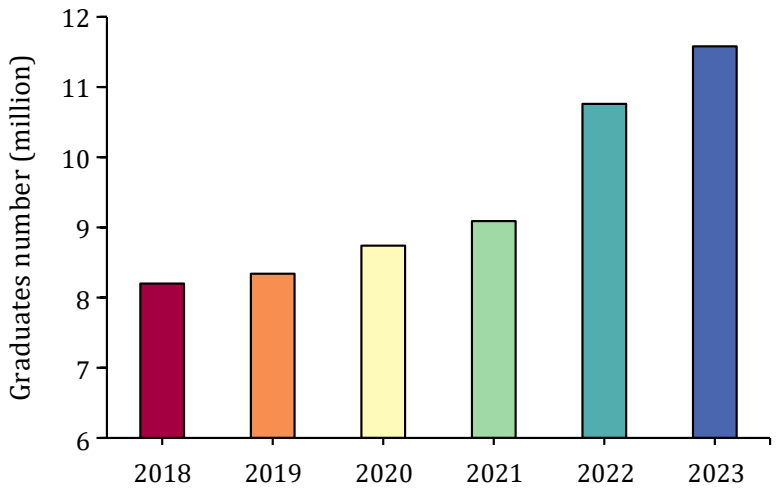

Figure 1. Number of recent university graduates

Disaster Prevention and Control is a compulsory course for safety engineering majors in colleges and universities. The course covers gas disaster prevention and control, fire prevention and control, mine dust prevention and control, mine water control, and other natural disaster prevention and control theories and technologies in coal mines. Its aim is to help students understand the concept of the five major disasters in mines and to master the basic prevention and control measures. Traditional teaching focuses too much on students' knowledge and neglects the development of practical extension sessions and innovative module components [10]. Therefore, in order to improve students' innovative and entrepreneurial ability in mine disaster prevention and control, this study proposes a balanced development model of theory-practice-dual. The programme aims to develop a multidisciplinary disaster prevention and control system, which combines theoretical and practical knowledge. It also aims to expand students' thinking by providing innovative experimental teaching platforms, disciplinary competition platforms, and entrepreneurial service platforms. This will help to cultivate students' innovative and entrepreneurial abilities in the safety engineering industry. It provides a basis for the reform of the education system in the context of new engineering, and at the same time, provides targeted opinions for the cultivation of innovative and entrepreneurial talents in safety engineering.

2. ANALYSIS OF THE CURRENT SITUATION OF CULTIVATION OF COLLEGE STUDENTS

2.1. Analysis of theoretical teaching

Currently, university education focuses on theoretical studies and ignores the importance of practical courses, resulting in students only learning theoretical knowledge in the classroom and wasting a lot of time studying outside the classroom. In addition, the teaching content and methods are single, and students are in a passive state of acceptance, lacking a sense of participation and the cultivation of innovation and entrepreneurship.

2.2. Analysis of practical teaching

In recent years, with the continuous advancement of China's innovation and entrepreneurship education reform endeavors, major universities have made progress in this educational endeavor. However, in terms of basic education on innovation and entrepreneurship, some colleges still lack funds and infrastructure, such as the lack of platforms and bases for innovation and entrepreneurship education. This leads to fewer opportunities for students to come into contact with innovation and entrepreneurship, as well as low motivation for students to innovate and start their own businesses. Student innovation and entrepreneurship protection is not perfect, a significant portion of colleges lack funding and teacher guidance, and China's education reform is still facing a lot of pressure.

2.3. Lack of practical ability in the teaching staff

The aim of reforming innovation and entrepreneurship education is to develop individuals with innovative thinking and abilities. This is achieved through practical experience in actual scenarios, innovation and entrepreneurship competitions, student skills competitions and other practical platforms, in addition to theoretical education in the classroom. Analyzed from the perspective of innovation and entrepreneurship, the teaching aspect of theoretical knowledge of innovation and entrepreneurship also differs from traditional professional knowledge, which pays more attention to cultivating students' innovative thinking and focuses on breaking through the constraints of the traditional knowledge framework. In addition, the theory of innovation and entrepreneurship education has multidisciplinary integration characteristics, but at present, the faculty of our colleges universities is mainly composed of professional course teachers and counsellors. As a result, there is a lack of skills and experience in multidisciplinary integration and difficulties in deepening innovation and entrepreneurship education.

2.4. Analysis of assessment methods

The traditional assessment method is based on the final theoretical knowledge test and lacks the assessment of students' innovation and entrepreneurship ability. this study is based on the dual-creation background of the assessment method on the line of change, to carry out diversified assessment criteria. The assessment is divided into stage test, innovation and entrepreneurship ability assessment, final test, the score proportion of 40%, 40%, 20%, respectively. The process assessment can reflect the students' mastery of knowledge at all stages of the programme and strengthen poorly mastered knowledge points in time. The innovation and entrepreneurship assessment is an innovation and entrepreneurship activity participated in at the end of the semester, which can help students to complete the transformation of theoretical and practical knowledge to innovation and entrepreneurship results.

3. INNOVATION AND ENTREPRENEURSHIP ABILITY TRAINING PROGRAM

The core of college students' talent cultivation in the context of new engineering is to cultivate students' innovation and entrepreneurship ability to fit to the current economic development. In order to promote the reform process of talent cultivation, this study constructed a teaching system of multidisciplinary integration in disaster prevention and control based on the characteristics of the safety engineering profession in the context of new engineering. The main process includes optimizing course theory and assessment reform, enabling students to understand advanced mine disaster prevention and control measures such as intelligent gas extraction, visual fire detection and integrated mine dust control, leading students to think independently, and improving students' thinking initiative and creativity. The analysis of the current situation of specific innovation and entrepreneurship and the map of cultivation lines are shown in Figure 2.

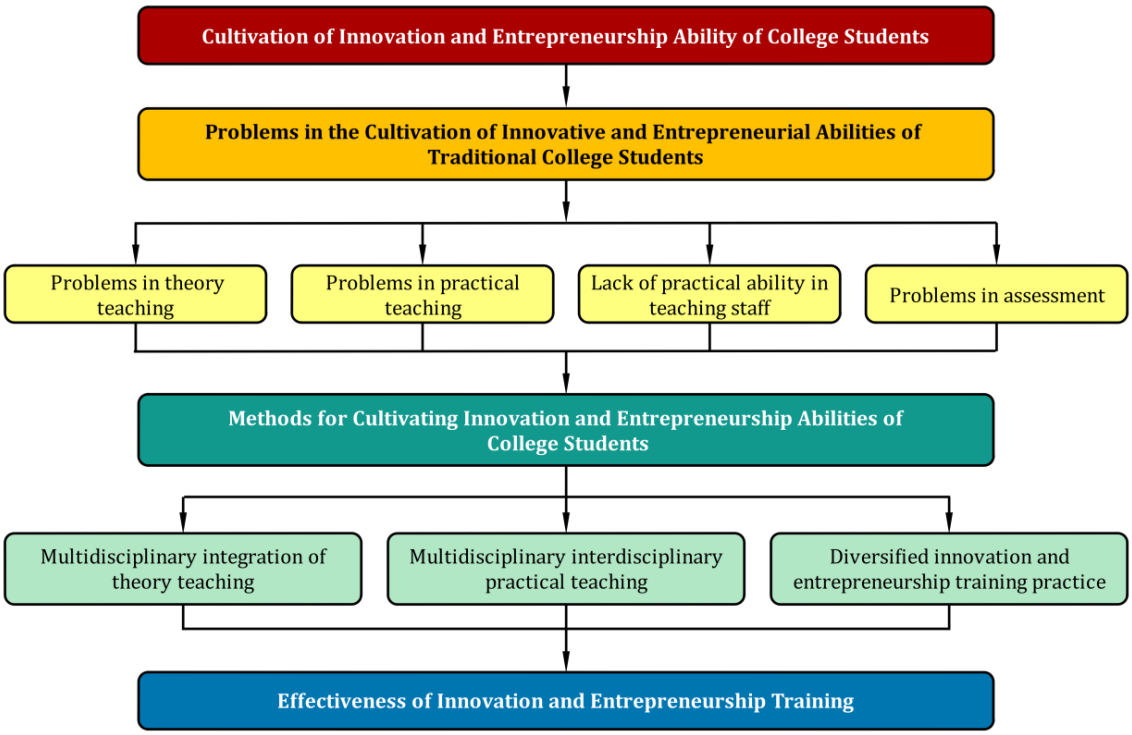

Figure 2. Current situation analysis and training process diagram

3.1. Multidisciplinary integration of theoretical teaching

In the process of classroom theory teaching, the main purpose of the discipline integration teaching system is to combine the current development situation, more in line with the mine disaster prevention and mitigation practice, in order to guide the students to do the foundation of engineering practice. Subject-integrated teaching can briefly surpass the upper limit of knowledge that students receive in the classroom and motivate them, depending on the task and their theoretical knowledge.

Intelligence is a major trend for future development, so big data is closely integrated with safety disciplines. The detection and prevention of hazardous sources in various places beneath the mine are gradually becoming more intelligent, such as intelligent monitoring of underground gas concentration, intelligent dust removal underground, and visualised fire prevention and extinguishing underground. This provides improved disaster prevention and control, as well as saving a lot of disaster prevention and control costs. The integration of big data and safety disciplines can expand students' thinking in safety prevention and control, deepen their comprehension of the concept of disaster prevention and control, and visually demonstrate students the development and progress of science and technology. As the beginning of a teaching course, it is especially vital for theory courses to stimulate students' interest and guide them into the beginning. Combining emerging advanced technologies from various disciplines with disaster prevention and control concepts can stimulate students' curiosity, inquisitiveness and learning requirements. Teachers should lead students into the classroom with a problem-oriented approach so that they can think autonomously and become the main body of the classroom. Diverse tutorials should be introduced into the classroom, utilising the pedagogical strengths of different disciplines to introduce questions that enable students to enter into a state of knowledge exploration on their own, and to guide their creative thinking.

3.2. Multidisciplinary integration of practical teaching

The subject matter of the Disaster Prevention and Control Practice course is to teach the use and working principles of mine gas control systems, integrated mine dust control systems, and fire control system equipment. In order to improve the practical ability of students, by constructing of a practical

teaching platform, additional methods such as the determination of gas dissipation index, the determination of the cohesion coefficient of coal body, the testing of toxic and harmful gases in mines, the determination of gas pressure and gas content of coal seams and other course design. The method can be based on the existing teaching and be able to enhance the practical ability of the students and the theoretical aspects of the understanding. A digital mine 3D modelling platform is added to the course design session, and students are modelled separately according to their interests and specialities, so as to cultivate their innovative and entrepreneurial abilities in a targeted manner.

I Additionally, the big data service platform is utilized to simulate the operation process of the mine disaster prevention and control system, as well as the equipment's operation principles. This helps students understand the construction site and increases their practical reserve for potential aspects of innovation and entrepreneurship. It also enables students to apply their theoretical knowledge to practical processes. Strengthen the cooperation between schools and enterprises, lead students to visit enterprises, understand the latest technology of mine disaster prevention and control industry, and learn the latest development trend of the industry. This allows students to keep up with the development of the times and meet the current trend of the urgent need for innovative and entrepreneurial talent training.

3.3. Diversified Practice Cultivation

A practical course session on disaster prevention and control is offered in the practical teaching session, allowing students to select a prevention and control session of interest from mine disaster prevention and control. Using the theoretical knowledge learnt and the basis of 3D modelling to independently design a prevention and control system, or design a disaster prevention and mitigation device, to achieve the transition from theory to practical exercises. Making use of the existing scientific and technological projects and topics of the professional teachers, which encourage students to participate in research projects. Simultaneously, organising student-led innovation and entrepreneurship groups to participate in innovation and entrepreneurship competitions can cultivate students' innovative and entrepreneurial thinking in disaster prevention and control. This can aid in the transformation from theoretical and practical learning to practical application. The aim of this course is to enhance students' comprehension of fundamental disaster prevention and control principles, as well as their proficiency in using protective equipment. The course will equip students with the necessary skills to solve practical problems and establish a strong foundation for future engagement in gas prevention in mines, comprehensive dust control, and fire prevention and control.

4. CONCLUSION

In order to ensure the stable development of China's economy, the cultivation of innovation and entrepreneurship ability of college students has become the focus of the current education reform. this study analyses the current problems in education from the aspects of theoretical teaching, practical teaching, faculty, assessment methods, etc. To enhance innovation and entrepreneurship education for college students and develop their abilities in this area, this study proposes a multidisciplinary integration of disaster prevention and control education system. This addresses issues with traditional teaching methods and aims to increase students' interest in innovation and entrepreneurship, foster their thinking in this area, and encourage them to participate in related competitions. The implementation of this system has yielded positive results.

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