

# Research on the Path of Innovation and Entrepreneurship Education for Civil Engineering College Students

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## Abstract

With the development of large-scale civil engineering construction and national infrastructure construction, the demand of civil engineering specialty is expanding rapidly and has higher requirements. As a highly applied specialty, Innovative practical teaching plays a very important role in the teaching system of civil engineering specialty, but it is hindered at present. In view of the present situation of Innovation and Entrepreneurship Practice Education for civil engineering students, this paper puts forward some measures to perfect the guarantee, constructing the four-in-one cooperative education mode of "Government College Industry and Enterprises ", strengthening practical teaching and so on, in order to explore the path of innovation and entrepreneurship education for civil engineering college students.

## Keywords

**Civil Engineering; Innovation and Entrepreneurship Education; Collaborative Education.**

## 1. Introduction

At present, the infrastructure construction in our country is in the stage of rapid development, the quantity of engineering is increasing sharply, the innovation of engineering technology is obviously insufficient, and many engineering problems have not been solved. As a specialty with strong application and practicality, Innovative Practical Teaching plays a very important role in the teaching system of civil engineering specialty. The New Engineering Department puts forward new requirements for the training of civil engineering talents. In addition to having a very high professional literacy, it should also have the quality of innovation and entrepreneurship in order to solve the practical engineering problems. However, there are many problems to be solved in the development of Innovation and Entrepreneurship Education in civil engineering universities, such as less platform, imperfect educational mechanism and so on. Therefore, it is necessary to solve the problem as soon as possible, speeding up the cultivation of a number of high-quality innovative and entrepreneurial talents in civil engineering, and contributing to the construction of national engineering.

## 2. The Present Situation of Innovation And Entrepreneurship Education for Civil Engineering College Students

### 2.1. There Are Few Ways and Platforms for Practical Education on Innovation and Entrepreneurship

The lack of practical platform for innovation and entrepreneurship education is a common problem. Students lack platform support and do not form a system. Colleges and universities do not pay enough attention to the education of Innovation and Entrepreneurship, and there are few ways to carry out it. The practical education of Innovation and Entrepreneurship in most colleges and universities is carried out in the form of curriculum, lecture and so on, and

the content and mode of the course are lack of systematizations and integrity. It cannot be carried out according to the characteristics of civil engineering, and cannot fully meet the needs of students to improve their employability.

Although the government, colleges, and universities have established entrepreneurship Practice Park, but can accommodate the innovation and entrepreneurship team is limited, it cannot meet the huge needs of students. At the same time, the platform of civil engineering test center is limited, and the enterprise is unwilling to accept students for professional practice in terms of safety and profit. Students lack of platform to carry out, entrepreneurial effect is not ideal.

## **2.2. Insufficient Integration of Innovation and Entrepreneurship Education and Professional Education**

Under the background of the national call on mass entrepreneurship and innovation, the Innovation and Entrepreneurship Education in colleges and universities is also in full swing, but some colleges and universities still lack in-depth understanding and understanding of the concept of Innovation and Entrepreneurship Education. There is a lack of organic integration of Innovation and Entrepreneurship Education and Civil Engineering Education.

Obviously, the purpose of Innovation and Entrepreneurship Education should not only train entrepreneurs, but also cultivate talents with the basic quality of entrepreneurship under a certain professional education background. Students in the professional curriculum Innovation and Entrepreneurship Education gains less, not deeply impressed. Although the teacher will teach scientific research and innovation methods and add some entrepreneurial cases, it is difficult to form the transformation from case analysis to entrepreneurial practice.

## **2.3. Lack of Teachers with Practical Experience in Innovation and Entrepreneurship**

Teachers are important guides and implementers of mass entrepreneurship and innovation education, and they are the important openers of students' innovative thinking and entrepreneurial ability. Now both professional knowledge and practical ability of the teaching staff is relatively scarce. At present, the number of full-time innovation and entrepreneurship tutors in colleges and universities in China is limited, which is difficult to meet the needs of innovation and entrepreneurship education in colleges and universities. And most teachers do not experience professional system training and lack the background of civil engineering professional knowledge, which is unable to provide targeted professional guidance to students. The subject of civil engineering belongs to the traditional engineering subject. In the course of teaching, the professional course teacher is confined to the traditional teaching content and system in the face of new technology, so the course is difficult to meet the requirements of cultivating civil engineering professionals with innovative and entrepreneurial quality. It is difficult to improve students' ability to innovate and start a business.

## **2.4. Innovation and Entrepreneurship Education Has Not Yet Formed A Perfect Mechanism of Co-Education in and Out of School**

At present, the Innovation and entrepreneurship education of college students mainly stays in the school stage, which is difficult to get the support of out-of-school education resources. Educational resources inside and outside the school have not yet been coordinated. The cultivation of college students' innovative and entrepreneurial ability is a comprehensive, systematic and complex project, which cannot be realized only by the strength of colleges and universities. We must give full play to the forces of the government, enterprises, industries and other parties, and coordinate with each other. Only by forming a joint force can we create a good external environment for the cultivation of college students' innovative and entrepreneurial ability.

### **3. Research on the path of Innovation and Entrepreneurship Education for Civil Engineering College Students**

#### **3.1. Strengthen the Top-Level Design and Improve the Training Program**

According to the characteristics of civil engineering specialty, the school can perfect the mechanism of innovative entrepreneurship education in order to improve the quality of engineering personnel training. Under the two-level management mode of the school, the leading group of Innovation and Entrepreneurship can be set up to clarify the responsibility of the reform of Innovation and entrepreneurship education in all relevant departments and colleges. The college can set up innovation and entrepreneurship clubs and other organizations to be responsible for the implementation of Innovation and Entrepreneurship activities, but also can be divided into specialties to refine innovation and entrepreneurship organizations. Civil engineering majors take this major as the starting point to explore opportunities for innovation and entrepreneurship.

At the same time, the innovation and entrepreneurship education is implanted into the whole course of civil engineering professional teaching, the innovation and entrepreneurship education is integrated into the various links of the professional training program. The curriculum system is improved, the innovation practice system meeting the multi-party needs is established, the students' creative ability is cultivated and developed, and the innovation and entrepreneurship education is integrated into the whole process of the civil engineering talent cultivation.

#### **3.2. Establish An Incentive System and Strengthen Financial Security**

Colleges and universities should introduce incentive measures for teachers to carry out innovation and entrepreneurship based on scientific and technological achievements, and regard the results of teachers' innovation and entrepreneurship education as an important index of professional and technical job evaluation and performance evaluation. In the recognition and reward conditions for students, students' innovation and entrepreneurship practice results can be specified to be included in the credits. In the evaluation of students' excellence, the students shall be given credit recognition in the test guarantee research, and students are encouraged to carry out innovation and entrepreneurship. At the same time, teachers are encouraged to lead students to rely on the transformation of scientific and technological achievements for innovation and entrepreneurship, so as to improve the entrepreneurship rate and success rate of teachers and students.

The education of innovation and entrepreneurship in colleges and universities is restricted by the guarantee of funds. In order to develop the education of innovation and entrepreneurship rapidly, colleges and universities should set up special funds to carry out the work of innovation and entrepreneurship. We can also set up innovation and entrepreneurship fund to stimulate students to make achievements in innovation and entrepreneurship practice.

#### **3.3. Create A Cultural Atmosphere for Campus Entrepreneurship**

Campus innovation and entrepreneurship culture can edify and guide students to innovate and start a business, and plays a positive role in carrying out practical education of innovation and entrepreneurship in colleges and universities. Colleges and universities can hold annual propaganda sessions on innovation and entrepreneurship, organize results exhibitions, organize lectures, salons and roadshows at all levels through student innovation and entrepreneurship associations, clubs and other organizations, so as to build a platform for entrepreneurial students to communicate and learn. Create innovation and entrepreneurship atmosphere in the whole school, enhance students' understanding and interest in innovation and entrepreneurship.

### **3.4. Build A "Government College Industry and Enterprises" Cooperative Education Model of Innovation and Entrepreneurship**

Innovation and entrepreneurship education is a complex system engineering, which needs to cooperate with local governments, industries and enterprises to transform the high quality scientific research resources and out-of-school resources into educational resources. Colleges and universities take the lead, working with civil engineering colleges and universities, cross-disciplinary colleges and universities, industry enterprises to build "Innovation and Entrepreneurship Alliance", building civil engineering students innovation and entrepreneurship practice platform and scientific and technological achievements transformation platform, building the government, colleges and industry, enterprise "four in one" innovation and entrepreneurship collaborative education model.

In terms of school resources, in addition to perfecting the curriculum system of innovation and entrepreneurship for civil engineering students, strengthening the training of "double teachers" can set up professional and technical entrepreneurship mentors to jointly provide guidance and help to students. In order to make up for the weak entrepreneurial awareness of professional education teachers and the lack of professional knowledge of innovative entrepreneurial mentors.

At the same time, the school actively seeks government cooperation, through the school and the government to build cooperation results, to provide a guarantee for the development of innovation and entrepreneurship. Considering the actual situation in which the enthusiasm of local enterprises to participate in the training of talents in colleges and universities is not high, and the depth and breadth of local enterprises are lacking, Civil engineering disciplines should combine their own professional advantages to set up scientific research organizations to seek cooperation with enterprises and industry organizations.

Through deepening the cooperation between government and school, we can provide policy guarantee for the introduction of high-end talents, provide talent guarantee for innovative and entrepreneurial education, and enrich the strength of teaching teachers. Making use of the existing entrepreneurial bases in the school to train engineering and technical talents, combined with the professional education of civil engineering students, is conducive to enriching the teaching diversity of innovative entrepreneurship education and improving the innovative ability of students in the industry. It is also helpful for the development and transformation of enterprises. Through deepening the cooperation between school and enterprise, we can provide incubation base for college students' innovation and entrepreneurship practice, and provide professional guidance and training, business service, investment and financing docking, etc., so as to effectively improve the innovation practice and entrepreneurial ability of civil engineering college students. Gradually formed "the government provides protection, the industry leads the science and technology frontier, the school provides the talent support, the enterprise builds the practice platform" the four-in-one mass entrepreneurship and innovation practice education platform.

### **3.5. Strengthen the Practical Teaching of Civil Engineering Specialty**

As a very practical specialty, civil engineering specialty should guarantee the effect of practical teaching in advance in order to ensure good innovation and entrepreneurship results. Practical teaching is not only an important means to cultivate students' innovative thinking and practical ability, but also an important bridge to make entrepreneurship education deserve its name.

In a broad sense, production practice, professional competition, invention and creation, social practice, students' participation in teacher scientific research, patent application and graduation design (thesis) are all-important components of practical teaching. At present, the college students' competitions related to civil engineering major are already quite rich, and the competitions cover different levels of "hospital-school-province (region)-country". The events

at all levels have been standardized, standardized and normally operated. With the continuous transformation and upgrading of civil engineering industry, new technologies and methods have emerged, such as assembly architecture, building information model (BIM) and so on.

In practical teaching, we can supplement the original content, constantly sort out the events, create an excellent and efficient "competition package" for professional events, and encourage teachers and students to take an active part in the above-mentioned levels of competition activities. Moreover, in the process of constantly strengthening communication with industry enterprises. In addition, we should make great efforts to standardize the outstanding problems existing in patent declaration, innovation invention and related social practice activities of college students, and strive to improve students' practical ability, so as to improve their ability of innovation and entrepreneurship.

### **3.6. Build An Evaluation System for Innovation and Entrepreneurship Education**

The construction of the four-in-one collaborative education model of "Government College Industry and Enterprises " and the continuous strengthening of the practical teaching of civil engineering specialty inevitably require the establishment of the evaluation system of innovative entrepreneurship education, through the adoption of different evaluation methods. Select the elements from different dimensions to evaluate, timely grasp the effectiveness and existing problems of innovative entrepreneurship education, so as to continuously improve and perfect the defects and deficiencies.

At the same time, we can get the relevant information feedback from the senior students, and constantly improve and innovate when carrying out collaborative education in the lower grades, so as to improve the collaborative education model of innovative entrepreneurship and ensure the quality of innovative and entrepreneurial education for civil engineering students.

## **4. Conclusion**

The education of innovation and entrepreneurship for civil engineering students is not only the inherent need of educational reform under the background of new engineering, but also the potential requirement of national infrastructure construction, but also the actual demand to complete the training of engineering talents. At present, there are still many problems in innovation and entrepreneurship education for civil engineering students. In order to solve these problems effectively, it is necessary to integrate innovation and entrepreneurship education into civil engineering education. Through the method of "four in one" collaborative education mode, the innovative spirit, entrepreneurial consciousness and innovative entrepreneurial ability of civil engineering students can be cultivated.

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