

The Value Implication and Practice Path of Innovation and Entrepreneurship Education in Universities of Science and Engineering

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Abstract—This paper analyzes the significance of researching innovation and entrepreneurship in science and engineering colleges and universities entrepreneurship education, points out the value implication and practice path of innovation and entrepreneurship education in science and engineering colleges, aimed to provide reference for the innovation of entrepreneurship education in colleges field, grope for a more mature way of creative education.

Keywords: *entrepreneurship and innovation education, science and engineering, education mode*

I. INTRODUCTION

In the 2019 state council work report on March 5, Premier Keqiang Li pointed out that the innovation-driven development strategy has been thoroughly implemented in the past year, and innovation capacity and efficiency need to be further improved. "Education has decisive significance in promoting the all-round development of the human being, enhancing the vitality of the Chinese nation for innovation and creation, and realizing the great rejuvenation of the Chinese nation" is an important content proposed by general secretary Jinping Xi at the 19th CPC national congress. Therefore, with the continuous implementation of the concept of "mass entrepreneurship and innovation" and the rapid development of national science and technology, innovation and entrepreneurship has become a new way to promote social progress.

The implementation of development strategy cannot be separated from the continuous influx of innovative talents, while the cultivation of talents cannot be separated from the education of various universities. Among them, students in science and engineering universities are outstanding in creativity and imagination, so innovation and entrepreneurship education in science and engineering universities is promoted by national policies and social needs [1]. How to better integrate innovation and entrepreneurship into the education and training of various universities of science and technology and the significance of such practice have become a hot topic of social discussion.

II. OVERVIEW OF THE CURRENT SITUATION

A. Research Status in Some Developed Countries

1) *The United States:* In the research on innovation and entrepreneurship education, the research and development of foreign countries are earlier than that of China, among which the United States, as the first country to discover and carry out entrepreneurship education, is the most representative. As early as 1947, Harvard University offered the first course of "new business administration" in American universities. Since the development of innovation and entrepreneurship education in the United States, there have been more than 1,800 colleges and universities offering such courses, which has a relatively complete theoretical research and education system, and is undoubtedly among the best in the world [2] [3].

2) *The British:* The UK's entrepreneurship education was first introduced in 1982. It has experienced the ideological transformation from solving the employment problem of college students to realizing the essential idea of entrepreneurship education. For this reason, the government has given great support and encouragement in the policy, and guaranteed the manpower, material resources and other aspects. Up to now, Britain has the most advanced incubator, among which the most representative ones are Cambridge Sino-British science and technology park and Birmingham science and technology park. Its double-innovation education has a hierarchical curriculum system and flexible teaching methods [4].

3) *Japan:* The education of innovation and entrepreneurship in Japan is similar to that in Britain. It was initially developed in the form of a combination of universities of science and technology and social enterprises. Since 2000, the Basic Law of Science and Technology and the Law on Promotion of University Technology Transfer promulgated by the Japanese government have made rapid progress in mass entrepreneurship and innovation education. The close connection between government, industry, school

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and research is a major feature of Japan's innovation and entrepreneurship education [5].

B. Research Status in China

In 1998, innovation and entrepreneurship education in Chinese universities was implemented for the first time. Tsinghua university has become the first university to introduce the competition of college students' business plan into Asia. [6] Over the past 20 years, entrepreneurship and innovation education has been gradually valued by the government, enterprises and universities. Entrepreneurship and Innovation Foundation has gradually become a compulsory course for undergraduates. The education system and training methods of entrepreneurship and innovation education in universities are also gradually explored and improved. Nowadays, the CDEP platform of the United Nations youth employment network China demonstration project has opened an innovation and entrepreneurship system, which indicates that the development of mass entrepreneurship and innovation education in China is connecting with the world [7].

III. THE VALUE IMPLICATION

A. Advantages of Entrepreneurship and Innovation Education in Universities of Science and Engineering

Science and engineering is a wide range of disciplines. It is the nature, science and technology collectively, including biology, physics, chemistry, astronomy, engineering and mathematics these six categories of disciplines and related combination of subjects. In the education system of science and engineering universities, practical teaching occupies a certain proportion, which can better improve students' operational skills and operational ability [8]. It is easier for interdisciplinary students to collide with new fields and lay a solid foundation for their innovative thinking.

B. Enhance the Quality of Students

Although science and engineering universities have certain advantages in innovation and entrepreneurship due to their discipline characteristics, most students are addicted to academic research and scientific exploration, and lack interpersonal communication and cooperative communication. In addition, the implementation of mass entrepreneurship and innovation education can not only enhance students' entrepreneurship and acquire relevant theoretical knowledge in the aspect of theoretical thinking education, but also enhance their solidarity, cooperation and communication skills in more practical activities. The improvement of students' own quality is not only conducive to promoting the development of innovation and entrepreneurship education, but also a necessary ability for students to survive in the society.

C. Promote Innovation and Development of Enterprises

The purpose of innovation and entrepreneurship education is to train a large number of outstanding innovative talents, provide more employment opportunities and create new industries, so as to improve the country's economic level and promote the development of science and technology. Under the educational model that combines mass entrepreneurship

and innovation education with professional education, a large number of young people with strong practical ability, active logical thinking and innovative spirit can be cultivated. They can give full play to their rich ideas and abilities in the society and enterprises. Compared with students trained in the traditional mode, they can better promote the development and progress of enterprises, or establish their own new enterprises, so as to promote the development of the society.

D. Make the Education System for Mass Entrepreneurship and Innovation More Mature

The field of innovation and entrepreneurship in China has only been developing for more than 20 years, and the innovation and entrepreneurship education system is still exploring, developing and improving. Since the Ministry of Education of China issued and implemented the opinions of the Ministry of Education on Vigorously Promoting Innovation and Entrepreneurship Education in Universities and College Students' independent Entrepreneurship in 2010, efforts have been made to vigorously promote mass entrepreneurship and innovation education system in colleges and universities. Since there is no mature mass entrepreneurship and innovation education system, the implementation of the education system in colleges and universities is also in the process of constant discovery and exploration. The combination of the teaching characteristics of science and engineering colleges and mass innovation education is a more favorable way to cultivate talents. The education system for innovation and entrepreneurship still needs to be further reformed. Therefore, the implementation of the existing system is more likely to find areas that need to be made up and make the education system more mature.

IV. PRACTICAL PATH

A. Create A Professional Faculty

Due to the immature development of mass innovation and entrepreneurship education, few teachers are fully engaged in and experienced in innovation and entrepreneurship. Therefore, the training of teachers should be more efficient and faster than that of students. With the rapid development of era, the professional teaching staff is more refined. In addition to deepening their understanding of innovation and entrepreneurship, teachers engaged in mass entrepreneurship and innovation education should have more contact and communication with social enterprises and establish a relevant teacher training system. Science and engineering colleges and universities can hire outstanding entrepreneurs from social enterprises, entrepreneurs and investors with rich practical experience and practical innovation of entrepreneurial experience people to join the faculty, such not only can affect the teachers of the school only, also make the whole education way and the content more operational and professional, fully exert the advantages and potential of the science and engineering students, make it a better understanding of society and in the future in advance are more likely to integrate [9].

B. *Improve the Education System in Universities*

1) *The Teaching System*: General secretary Jinping Xi once put forward at the national education conference: "vigorously promote the reform and innovation of the education system, in order to make China's education better and stronger." For innovation and entrepreneurship in science and engineering universities to join, we should establish a sound teaching system quickly. While earnestly implementing the party's education policy and relevant documents, training programs, training plans, teaching materials and teaching plans in the field of innovation and entrepreneurship should be allocated according to the characteristics of mass entrepreneurship and innovation education, instead of directly following the training methods of traditional education.

2) *Curriculum System*: In 2019, the Ministry of Education has set new tasks and instructions for demonstration colleges and universities in mass entrepreneurship and innovation education reform: to build open online courses for mass entrepreneurship and innovation education and demonstration courses featuring "integration of specialty and innovation". Make full use of modern information technology and educational resources to create high-quality online open courses, combine professional knowledge with innovation and entrepreneurship knowledge, and create characteristic courses to lay a solid foundation for students to engage in future practical activities. Due to the particularity of mass entrepreneurship and innovation education, in addition to face-to-face courses and online courses, colleges of science and engineering should also design relevant practical activity courses [10], so as to increase students' practice opportunities, enhance their innovation and entrepreneurship ability in practice, summarize practical experience, and better explore their own path.

3) *Evaluation Standard*: Due to the complexity and comprehensiveness of the innovation and entrepreneurship field, the evaluation criteria need to be further agreed upon at the national university level so that students can develop in different places. In the process of carrying out mass entrepreneurship and innovation education, colleges and universities should not only evaluate students' innovation and entrepreneurship ability based on test scores, but also give more consideration to their practical ability and innovative thinking. In addition, the ability performance in a short period of time cannot indicate the level of innovation and entrepreneurship, so there should be follow-up evaluation for each student at different stages to observe the degree of students' ability growth. In the process of follow-up investigation, we can also find the deficiencies of the mass entrepreneurship and innovation education system for further improvement.

Students need a complete and unified evaluation system, teachers also need such an evaluation system to better educate students. Teachers engaged in the field of innovation and entrepreneurship should have corresponding evaluation standards to judge whether they are professional enough and

qualified to lead students into the field of innovation and entrepreneurship.

4) *Teaching Resources*: In order to give full play to students' innovative and entrepreneurial ability and ideas, colleges of science and engineering should provide abundant teaching resources. Some colleges and universities set up their own crowd innovation space, pioneer park and incubator on campus to provide space for students who are preparing to start a business or are in the process of starting a business. They can also communicate and study with peers with similar ideas and mature entrepreneurs. For students who are not mature in entrepreneurship and have just come into contact with the field of entrepreneurship and innovation, colleges and universities should provide more practical opportunities, hold relevant competitions or experience lectures on campus or jointly with enterprises, so that students can have a better understanding of the field of entrepreneurship and innovation.

C. *Close Integration of Government, User, Industry, Education and Research*

With the combination of "production, study and research" as the background, "politics and users, production, study and research" is a deep evolution of practice and understanding. With the progress of science and technology and the development of innovative thinking, the role of the government in policy guidance and innovation platform construction, as well as the role of users in the field of innovation and entrepreneurship are gradually highlighted. Colleges and universities should actively make use of and deepen the synergy of government, users, industry, education and research, mobilize all forces to achieve professional guidance for students, generate more efficient education methods and create a strong atmosphere of innovation and entrepreneurship.

V. CONCLUSIONS

Although the development of innovation and entrepreneurship education in science and engineering universities has made initial achievements so far, there are still many shortcomings that need to be improved in the future, such as the unreasonable combination of mass innovation and entrepreneurship education and professional education, the low enthusiasm of students for innovation and entrepreneurship, and the professional teaching staff. This paper analyzes the significance of the research on innovation and entrepreneurship education in universities of science and engineering, and discusses the value implication and practice path of innovation and entrepreneurship education in universities of science and engineering. It has certain reference value for the development of innovation and entrepreneurship education in science and engineering universities in the future.

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