

Discussion on the Construction of Practice Platform of Diversified and High-Level Innovation and Entrepreneurship Education in Colleges and Universities

Wang Xi, Liu Chunli*, Liu Jian, Zhang Xiaojun

School of Mechanical Engineering and Automation, University of Science and Technology Liaoning, Anshan, China

Email address:

Wx1870@yeah.com (Wang Xi), 319973400024@ustl.edu.cn (Liu Chunli)

*Corresponding author

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Abstract: Innovative and entrepreneurial talents are the fundamental guarantee for implementing the national innovation driven development strategy, and practical teaching is an important link in cultivating applied talents and an important means to improve students' engineering application and innovation abilities. Under the guidance of the policy of "mass entrepreneurship, mass innovation", innovation and entrepreneurship education practice platforms in colleges and universities across the country have sprung up, playing an increasingly important role in cultivating students' entrepreneurship, incubating creativity, and assisting start-ups. But at the same time, the problems in the construction of innovation and entrepreneurship education practice platform in local colleges and universities are also gradually highlighted. In order to promote the development of "mass entrepreneurship and innovation education" in China, this paper combs the current situation of "mass entrepreneurship and innovation education practice platform" in China, compares and analyzes the construction of "mass entrepreneurship and innovation education practice platform" in universities at home and abroad, points out the shortcomings of local universities in China in the construction of "innovation and entrepreneurship" education practice platforms, and proposing targeted suggestions and measures to improve the diversified and high-level "innovation and entrepreneurship" education practice platforms in universities. Therefore, on this educational practice platform, innovative talents with engineering applications can be cultivated, thereby meeting the demand of society for outstanding talents in this field.

Keywords: "Entrepreneurship and Innovation" Education, Innovation and Entrepreneurship Education, Education Practice Platform, School-Enterprise Cooperation, Makers

1. Introduction

The document of the 19th National Congress of the Communist Party of China put forward the goal of "building an innovative country and a world power in science and technology". In the report of the 19th National Congress of the Communist Party of China, it clearly put forward specific ways and methods of "stimulating and protecting entrepreneurship, encouraging more social entities to participate in innovation and entrepreneurship", and promoting the transformation of scientific and technological achievements through "a technological innovation system with deep integration of industry, university and research". The country has raised

innovation and entrepreneurship to the national strategic level, which will promote China to become an innovative country and realize the transformation from "Made in China to" Made in China". Therefore, "mass entrepreneurship and innovation" has become the strongest voice of the era. The foundation of innovation and entrepreneurship is high-quality talents. As the main position of talent training, colleges and universities are duty-bound to shoulder the responsibility of innovation and entrepreneurship education. Colleges and universities have also started the construction of "mass entrepreneurship and innovation" education and have made great achievements.

2. The Origin and Development of Innovation and Entrepreneurship Education

Peter Drucker, a famous management master, pointed out that entrepreneurship is a kind of training, and like any kind of training, people can master it through learning. Harvard University of the United States proposed and launched entrepreneurship education in the 1950s [1, 2]. Subsequently, the University of California, Berkeley, Massachusetts Institute of Technology and Stanford University have successively carried out entrepreneurship education and gradually led the world trend. According to the different characteristics of innovation and entrepreneurship, foreign universities put forward three models: innovation, improvement and business model innovation, and developed different curriculum education systems and educational organization forms according to different models [3, 4]. Innovative education in the American makes the American full of scientific and technological talents. It is reported that in 2019, the United States Patent and Trademark Office granted 333530 patents [5, 6].

The "entrepreneurship and innovation" education in China's colleges and universities began in 1988. Beginning with the first "entrepreneurship planning competition" held by Tsinghua University, the Central Committee of the Communist Youth League began to organize various entrepreneurship competitions in colleges and universities across the country. The State Council and the Ministry of Education issued separate documents to raise entrepreneurship and innovation education to the national strategic level. It can be seen from the national deployment that the national leadership hopes colleges and universities to cultivate students' entrepreneurial spirit, instill innovative thinking, build a scientific and technological research team, and promote scientific and technological innovation. This is highly consistent with the goals set out in the report of the 19th National Congress of China, and also the development direction of China in the future.

3. Current Situation of Entrepreneurship and Innovation Practice Platforms

In order to promote "entrepreneurship and innovation" education, the State Council and the Ministry of Education have put forward the requirements of developing "entrepreneurship service platforms such as mass entrepreneurship and innovation space, and running various entrepreneurship and innovation competitions". The construction of innovation and entrepreneurship service platform is the trend of the times, which is also an effective way to achieve the establishment of a country based on science and technology and build an innovative country.

3.1. Platform Concept of Innovation and Entrepreneurship Education Practice

The innovation and entrepreneurship education practice

platform includes innovation and entrepreneurship curriculum education, entrepreneurship guidance, maker space, entrepreneurship incubation base, innovation and entrepreneurship competition and support fund. The comprehensive service system for college students includes not only virtual cyberspace, but also real high-end equipment and incubation office space. Here, students can use precious university resources and combine their professional knowledge to evolve ideas into mature projects. Specifically, it includes the following aspects:

- (i). Innovation and entrepreneurship curriculum education: colleges and universities provide technical support for industries and projects according to market demand, and provide innovative thinking and methods related to innovation and entrepreneurship, as well as entrepreneurship legal advice.
- (ii). Entrepreneurship guidance: colleges and universities set up different entrepreneurial tutors for different disciplines, providing guidance for the whole process of project incubation from the beginning of student entrepreneurship to participation in innovation and entrepreneurship competitions.
- (iii). Maker space: Maker space refers to those groups who are interested and enthusiastic in technology and practice and are keen to implement their own ideas or projects by themselves. "Maker space" provides a practice platform for such groups.
- (iv). Entrepreneurship Incubation Base: This base provides training base, office space, training programs, and guides the establishment of innovation teams.
- (v). Innovation and entrepreneurship competition: provide competition information, organize various practical competitions, etc.
- (vi). Support fund: refers to various funds to support innovation and entrepreneurship education. According to the statistics of the Ministry of Education, since 2015 "The education funds for entrepreneurship and innovation" have reached 2.3 billion yuan, including 12.8 billion yuan of off-campus funds [7, 8].

3.2. The "Mass Entrepreneurship and Innovation" Education Practice Platform in Colleges and Universities Has Achieved Initial Results

According to the latest news on the official website of the Ministry of Education, up to now, China has established 19 "entrepreneurship and innovation demonstration bases" in universities and 200 demonstration universities to deepen innovation and entrepreneurship education reform. 3400 "entrepreneurship and innovation" education online open courses have been established, More than 6500 "innovation and entrepreneurship" characteristic demonstration courses have been selected, and the number of courses has reached 34 million. The "innovation and entrepreneurship" curriculum system has become increasingly sound. The demonstration institutions have established "entrepreneurship and entrepreneurship" transcripts for 2.06 million college

students. The "innovation and entrepreneurship" transcripts show that about 3700 college students have started businesses in the past five years. At the same time, the faculty has also grown. The Ministry of Education has hired more than 59000 talents of all kinds in the industry to serve as full-time or part-time teachers of "innovation and entrepreneurship", nearly 4000 training sessions for innovation and entrepreneurship teachers have been organized, with the training scale reaching to 340000 people. The teaching level of "entrepreneurship and innovation" teachers has been significantly improved, which is the most direct and gratifying achievement since the introduction of "entrepreneurship and innovation" education in China.

Colleges and universities across the country have successively established "innovation and entrepreneurship" education practice platforms. The "Internet and entrepreneurship" innovation and entrepreneurship competition, as an important platform for deepening the reform of innovation and entrepreneurship education, has achieved remarkable results [9, 10]. In order to encourage more students to participate in innovation and entrepreneurship training, the Ministry of Education has allocated 760 million yuan to support college students' innovation and entrepreneurship training program, "innovation and entrepreneurship" "The plan has attracted more than 160000 students from 1088 universities in China, of which more than 38000 projects have been funded.

3.3. Problems in the Practice Platform of Innovation and Entrepreneurship Education

Despite the great support of the government and the Ministry of Education, China's "entrepreneurship and innovation education" has made great progress, but there are still some problems to be solved.

The curriculum design of innovation and entrepreneurship is not perfect. According to foreign experience, innovation and entrepreneurship education has formed a systematic development. By the end of 2018, the Massachusetts Institute of Technology's Martin - Trust Entrepreneurship Center had opened four courses, namely, basic innovation and entrepreneurship courses, skills courses, industry-oriented courses and elective courses, with a total of 63 courses. Few colleges and universities in China can provide such rich educational resources, and some colleges and universities only use entrepreneurship lectures and entrepreneurship forums instead. According to the latest data released by the Ministry of Education, although the construction of online courses has made gratifying achievements, in terms of daily curriculum, some universities, especially local ordinary universities, still pay more attention to knowledge teaching and neglect the cultivation of innovation and entrepreneurship ability.

The situation of isolated birds in education practice platform information is relatively common. The innovation and entrepreneurship projects provided by the educational practice platform of colleges and universities often exist, and the coordination and communication between colleges and

universities are not smooth, and there is also a lack of communication between colleges and universities and enterprises, resulting in the inability to share resources [11]. At the same time, it also leads to the difficulty in the implementation of the creativity of colleges and universities, and the difficulty in transforming the invention results into products to serve the society.

The establishment of institutions is not complete, and the construction of teaching staff is not ideal. Entrepreneurship centers in colleges and universities are generally attached to industry centers or Communist Youth League organizations, many colleges and universities cannot view innovation and entrepreneurship from a strategic perspective. They just think that the role of entrepreneurship centers is to help students find jobs and improve the employment indicators of the university. For example, the Massachusetts Institute of Technology Entrepreneurship Center has formed a dual regulation of teachers. In addition to the teaching teachers of the school, it also hired experts or professional managers with practical experience and important influence in entrepreneurship to teach, providing students with comprehensive guidance on innovation and entrepreneurship. Although the Ministry of Education has hired 59000 outstanding talents from all walks of life as "entrepreneurship and innovation" instructors, colleges and universities still pay more attention to the conventional teaching of professional knowledge talents in terms of teacher allocation, especially talent recruitment, and the proportion of teachers specialized in "entrepreneurship and innovation" education in colleges and universities is still low.

The cooperation between schools and enterprises is not deep, and the investment of enterprises is small. As colleges and universities, education and knowledge transmission are their key points. Colleges and universities focus on the systematic and academic nature of knowledge, while enterprises focus on the feasibility and input-output ratio of projects, because this is related to the survival of enterprises. The needs of enterprises and the functions of colleges and universities can not be perfectly matched, resulting in enterprises' unwillingness to invest funds to start businesses for fledgling college students. According to the 2019 China Patent Survey Report, 623% of universities and scientific research institutions obtained research and development funds from "local science and technology program sponsorship", and only 385% of universities and scientific research institutions obtained research and development funds from horizontal funding entrusted by enterprises. It can be seen that there is still much room for cooperation between universities and enterprises. "Innovation and entrepreneurship education practice platform also have potential to be tapped.

It is unable to provide guidance and support for the whole process of entrepreneurship. Most of the "entrepreneurship and innovation" education practice platforms only focus on the creative competition stage. Due to the lack of teachers and support funds specialized in "entrepreneurship and innovation" education, the "entrepreneurship and innovation" education practice platform of colleges and universities

cannot provide students with perfect innovation incubation. The support at the initial stage of entrepreneurship, the subsequent team building, legal and regulatory consultation. The company's operation and other practical problems lack practical support. An obvious defect of the practice platform of entrepreneurship and innovation education in domestic colleges and universities is that most of them have only built a knowledge service platform, a policy propaganda platform and an entrepreneurial competition event organization. When an idea or product is taking shape, most educational practice platforms can only provide some free office space, experimental sites and initial start-up funds. Innovation and entrepreneurship instructors in colleges and universities can not fully meet the needs of a newly incubated enterprise. Team building, project management, tax coordination, technology patents and other issues may bring a devastating blow to the fledgling team.

4. Suggestions on Improving the "Mass Entrepreneurship and Innovation Education Practice Platform"

4.1. *Improve the Education System of Innovation and Entrepreneurship Courses, and Jointly Develop and Share Among Universities*

According to the existing research, in the innovation and entrepreneurship education ecosystem, the curriculum system is the second most important, second only to the education concept. It can be seen that the construction of the curriculum system plays an important role in "entrepreneurship and innovation" education. The construction of the innovation and entrepreneurship education system should strengthen the overall planning and fundamentally integrate the innovation and entrepreneurship curriculum system into the existing teaching system. According to the actual characteristics of various disciplines in colleges and universities, create innovative entrepreneurship curriculum guidance combining with practice. Maker spirit and maker culture should also be included in the curriculum series in a timely manner to provide strong support for innovation and entrepreneurship of college students from the spiritual perspective [12].

According to the successful experience of foreign countries and the groping of leading universities in China, the perfect innovation and entrepreneurship curriculum system should not only include the necessary professional knowledge and skills, but also include "entrepreneurship management, organizational behavior, marketing" and other aspects, including the war path and business opportunities, entrepreneurs, resources and business plans, entrepreneurial enterprise financing and rapid growth ". With the reserves of these knowledge and abilities, college students can deal with all kinds of complicated problems when they start a business.

At the same time, it is suggested that colleges and universities should jointly develop and establish high-quality courses and share them. It is possible to study and jointly

establish a perfect course system, and concentrate the elite forces of colleges and universities to create a batch of practical courses from the perspective of the market and in line with market demand. Set up a number of course libraries, case libraries and project libraries. These shared resources can be publicly shared and updated at any time. The educational practice platform among colleges, departments and government departments should share resources to create a positive atmosphere for innovation.

4.2. *Strengthen Maker Education and Promote Maker Spirit*

The concept of makers is innovation and creation based on interests. Under the guidance of craftsman spirit, they polish and create new things or update and improve existing products, and share with others in an open and shared atmosphere. Many new technologies are born out of the interests of makers and gradually attract many followers, resulting in new application fields. The core of Android system originates from Linux system, which is a good interpretation of the spirit of makers. Because of open source and free, Linux system has been continuously improved and explored by software engineers around the world, which ultimately makes it a stable and reliable operating system. Android, built on Linux, has been widely used in mobile phones and tablets, and has established a dominant position in these fields. It can be seen that the maker culture and the maker spirit provide the soil for the budding development of innovation and innovation, and encourage the general public to continuously participate in the cause of "mass entrepreneurship and innovation".

Maker education should begin with college freshmen. Makers mention tolerance, openness, sharing and divergent thinking. Most college freshmen who have received traditional education for decades lack these qualities. We should start to implement maker education from college freshmen, cultivate maker thinking and establish maker spirit; The habit of being curious about new things and wanting to be eager to try and realize their own theories and ideas by themselves will benefit these privileged children for life. Undoubtedly, these qualities are exactly what innovation and creation education requires and are also essential characteristics of future entrepreneurs and industrialists. Recalling that school education in China has always required students to study according to standard answers, Basically, they are taught that "the correct answer is the only answer; these rules and regulations set up under the exam-oriented education and the requirement of obeying the authority to obey the answer make students dare not put forward their own ideas, let alone practice to verify their own ideas. These negative factors disturb the thinking of college students, solidify their logic, which runs counter to the requirements of innovation and creation, and often lead to " mass entrepreneurship and innovation " Education cannot achieve good results by doubling the effort with half the effort. Therefore, Maker education should be integrated into the education system, so that college students can be immersed in the spirit of open sharing and excellence from the beginning of entering the campus, so that innovation and creation become

their lifelong pursuit.

Maker culture contributes to the atmosphere of innovation and entrepreneurship. The cultivation of maker spirit will enable the innovation and creation team to thrive and continuously provide high-quality products and services to the country and society. The innovative creation and "do-it-yourself" characteristics in the maker culture gene are very consistent with the national requirements of "mass innovation", and timely guidance and encouragement will create a thriving entrepreneurial situation.

4.3. Improve Institutions and Reform the Construction of Teaching Staff

Teachers in innovation and entrepreneurship centers usually belong to different departments. Communication between teachers and departments is often not smooth enough, and it is difficult to achieve perfect cooperation between teachers. Compared with Harvard University, Stanford University and other universities in the United States, they have established independent entrepreneurship centers, and the faculty is stable and efficient, forming an independent system. In this way, the teacher team can form an effective joint force to jointly create the cradle of entrepreneurship incubation.

The construction of the entrepreneurial education faculty of Cornell University in the United States is worth learning and imitating by our universities. Cornell, on the one hand, encourages its teachers to start up companies and impart their rich practical experience to students. On the other hand, it hires successful entrepreneurs and industrialists as visiting professors in universities and shares their entrepreneurial experience programming case library with students in the classroom. These business elites who have experienced hundreds of battles have taught students strategies and methods that have been proved to be effective after practical tests. These valuable assets can not be learned in the classroom. These measures of Cornell University of the United States have made it one of the models of entrepreneurship education in the United States. At present, domestic colleges and universities should learn from the practice of Cornell University in the United States to cultivate their own teaching staff and enhance their practical experience in entrepreneurship. In addition, we will actively introduce successful entrepreneurs to teach in our school. The entrepreneurial and practical experience of these successful people who have experienced the brutal market business war will give students strong guidance to face the market directly [13].

4.4. Universities and Local Governments Work Together to Improve the Service Capacity of the Innovation and Entrepreneurship Education Practice Platform

Strengthen the integration and upgrading of the "university-enterprise-society" three-spiral system, and build an in-school incubation platform with school-based and regional characteristics [14]. At present, the lack of entrepreneurship and innovation education platform in colleges and universities is that it cannot combine production,

learning and research. The reason is that the congenital foundation is not solid. Universities and enterprises should cooperate and penetrate each other. Enterprises should put forward directions according to their own needs. Universities should use the guidance of the market to establish research projects and innovation. In the whole process, enterprises should participate deeply, which can not only cultivate talents for enterprises, but also bring practical results to enterprises.

4.5. Enrich the Service Functions of the Practice Platform of Entrepreneurship and Innovation Education in Universities and Extend the Mission of Its Incubator

The innovation and entrepreneurship funds of colleges and universities are limited. Without venture capital or financial assistance from enterprises, it is difficult for start-ups incubated by the innovation and entrepreneurship education practice platform to survive and develop for a long time. The practice platform of entrepreneurship and innovation education in colleges and universities should establish a fund pool with appropriate scale, including the investment of innovation and entrepreneurship funds in colleges and universities, as well as the support funds of enterprises, especially local enterprise groups, and should actively strive for the incubation funds of local governments.

In addition, a seamless connection should be established between the practice platform of entrepreneurship and innovation education in universities and the local government service platform. After the start-up period, university incubation projects should be able to smoothly transition to the government's incubation base and enjoy the government's preferential policies and entrepreneurial support. For the projects incubated by the practice platform of entrepreneurship and innovation education in colleges and universities, and enterprises with market and technology foresight, the government should strengthen its support to make them quickly transition to the growth period.

5. Conclusion

The innovation and entrepreneurship practice platform in universities, as an important base for cultivating the innovation and practical ability of engineering talents, promotes the organic integration of engineering education and innovation and entrepreneurship education, constructs and improves the cultivation system of engineering talent cultivation, and is a reform and innovation of the engineering talent cultivation mode. The innovation and entrepreneurship platform needs to be continuously improved and perfected in various aspects such as basic practical teaching, interdisciplinary research and practice, and industry university research [15]. At the same time, we will strengthen cooperation and communication among governments, universities, enterprises, and research institutions, continuously improve the integration and diversification of platform functions, and provide practical and effective support for cultivating engineering talents that meet the new requirements of the times.

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- (i). General project of Liaoning provincial undergraduate education reform project in 2021 "Create a high-level engineering education practice platform and create personalized high-end talents".
- (ii). 2018 Liaoning University of Science and Technology Innovation and Entrepreneurship Education and Teaching Research Project.
- (iii). Construction and practice of innovation and entrepreneurship education carrier focusing on "three competitions, three training and three combinations". (GJ18ZD01)
- (iv). 2016 Liaoning Provincial Undergraduate Education Reform Project GeneralProject "Research on the cultivation mode of innovative and entrepreneurial talents of machinery based on practical innovation". (LJF [2016. 23])

References

- [1] Chen Xialing. Research on Innovation and Entrepreneurship Education Model and Practice in Colleges and Universities -- A Case Study of Four Universities in the United States [J]. Journal of the National Institute of Education Administration, 2019 (7): 74-81.
- [2] Cheng Xi, Li Shiyong. Index construction and weight analysis of university innovation and entrepreneurship education ecosystem [J]. University Education Science, 2020 (1): 99-106.
- [3] Mission & History [EB/OL]. [2019-04-20]. <http://entrepreneurship.mit.edu/mission/>
- [4] Hu Jian, Zhang Yan. Research on the characteristics of the innovation and entrepreneurship education curriculum system construction of MIT [J] Higher Education Exploration, 2019 (12): 69-73.
- [5] Luo Feijun. The curriculum of entrepreneurship education in American universities and its enlightenment [J]. Vocational Education Newsletter, 2011 (9): 56-59.
- [6] Baidu Encyclopedia <https://baike.baidu.com/item/linux/27050>
- [7] Lu Yan. Analysis on the path of innovation and entrepreneurship education in colleges and universities in the era of makers [J]. China University Science and Technology, 2019 (3): 57-59.
- [8] Xu Aihua, Wu Qingchun. Research on the collaborative education mechanism of colleges and universities based on the precise entrepreneurship education practice platform [J] Jiangsu Higher Education, 2020 (11): 109-112.
- [9] Du Juan. Ecological entrepreneurship education and its enlightenment of Cornell University in the United States [J]. Examination Weekly, 2018 (5): 5-15.
- [10] Zhong Shuping. Integration path of innovation and entrepreneurship education resources in universities [J]. Research on Ideological and Political Education, 2020, 36 (2): 156-160.
- [11] Hu Peng. Experimental platform construction and curriculum construction around intelligent manufacturing, educational modernization, December 2018, Issue 51, 192-193.
- [12] Zhang Hongtian. Exploration and practice of building an open practical teaching system to cultivate engineering applied talents [J]. China University Teaching, 2011 (8): 73-76.
- [13] Liu Mengqin. Building a diversified practical teaching system with the cultivation of innovative ability as the core [J]. Laboratory Research and Exploration, 2014, 33 (3): 189-193.
- [14] Wang Xi. Construction of the talent training mode of "three competitions, three training and three combinations" for the mechanical specialty [J]. China Metallurgical Education, 2017 (6): 61.
- [15] Dong Weiwei. Construction of virtual simulation platform system based on engineering innovative talent training [J]. Education and Teaching Forum, Issue 39, September 2020, 389-390.