

Research and Practice on the Construction of Education System of Innovation and Entrepreneurship and Production-study-research in Universities*

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Abstract—In recent years, cultivating innovative and entrepreneurial talents has become the primary condition for China to implement the innovation-driven development strategy. How to develop innovation and entrepreneurship education system construction is not only the focus of the government and industry, but also the focus of current higher education. Innovation and entrepreneurship education in universities must have direction and must be multi-directional. One of the directions is integrating production, study and research, which is an important way to cultivate innovative and entrepreneurial talents. Therefore, this paper briefly describes the connotation of the construction of innovation and entrepreneurship and production-study-research system in colleges and universities, analyzes the current situation, and on this basis puts forward some suggestions on the construction and practice of innovation and entrepreneurship and production-study-research system in colleges and universities, so as to provide reference for innovation and entrepreneurship education in colleges and universities.

Keywords—*innovation and entrepreneurship; production-study-research; education system construction*

I. INTRODUCTION

At the BBS summer Davos in September 2014, premier Li Keqiang put forward the concept of "mass entrepreneurship and innovation", which set off a new wave of innovation and entrepreneurship in China and created a new situation of "innovation by all, innovation by all". As an important part of higher education, local colleges and universities are the main body of innovation and entrepreneurship in the new era. Therefore, improving the collaborative innovation and entrepreneurship ability of local universities and build a creative production system can effectively link colleges and universities, scientific research institutions and companies to the advantage of resources, integrate the inherent vitality of talent, capital and information factors, promote the organic integration of education with technology and the economy, and the

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development of innovation and entrepreneurship.

II. THE CONNOTATION OF BUILDING THE EDUCATION SYSTEM OF INNOVATION AND ENTREPRENEURSHIP AND PRODUCTION-STUDY-RESEARCH IN COLLEGES AND UNIVERSITIES

Production-study-research integration is the catalyst for the transformation of university research achievements. It is based on self-organization theory, open innovation theory and organizational learning theory. In essence, it is to transfer and spread knowledge among industry-university-research organizations to achieve a win-win situation. Production-study-research organization is a self-organizing system, in which different elements combine into a cooperative relationship. Through continuous learning and evolution, it gradually moves towards an orderly and advanced process. Production-study-research collaborative innovation and entrepreneurship is composed of many elements, including the government, universities, research institutions and enterprises and other entities. Linked by deep cooperation, each element promotes each other and share innovative development. Government is the creator of innovation and entrepreneurship environment; universities and research institutes are the main operators of the innovation and entrepreneurship process; enterprises are the main body of product innovation, promoting industry-university-research cooperation, innovation and entrepreneurial results, in order to produce economic and social benefits. Under the influence of external environment and internal interests, various elements of production-study-research institute seek partners, and achieve sustainable and stable cooperation and collaborative innovation. Therefore, as for the building of an education system of innovation, entrepreneurship and production-study-research, it is helpful to cultivate college students' innovation consciousness and entrepreneurial ability, effectively reduce the disjoint of school from society, and improve students' employment consciousness and competitiveness so as to cultivate talents suitable for social development. It helps to coordinate and cooperate with each other, stimulate the joint effect of each element, and achieve deep, multi-angle and multi-dimensional cooperation among each element, so as to promote innovation and entrepreneurship.

III. CURRENT SITUATION AND PROBLEMS OF INNOVATION, ENTREPRENEURSHIP AND PRODUCTION-STUDY-RESEARCH EDUCATION IN COLLEGES AND UNIVERSITIES

A. *The Innovation and Entrepreneurship Education in Colleges and Universities Is in the Primary Stage*

At present, the research on innovation and entrepreneurship education in colleges and universities is gradually deepening, but it is still in the primary stage. The innovation and entrepreneurship education in some colleges and universities is still a kind of "amateur education" carried out in spare time and has not yet formed an effective innovative entrepreneurship education mode. When carrying out innovation and entrepreneurship education, they do not have a deep understanding of the concept of innovation and entrepreneurship education. Therefore, they cannot use the idea of innovation and entrepreneurship to guide the whole process of education. The level of teachers' innovation and entrepreneurship education needs to be improved, and it is urgent to cultivate a teacher team with both innovation and entrepreneurship theoretical knowledge and innovation and entrepreneurship practice ability. In addition, the lack of innovation and entrepreneurship practice platform hinders the development of students' innovation and entrepreneurship practice activities. And a kind of university culture conducive to the development of innovation and entrepreneurship education has not yet been formed in the campus. Students' occupational values are vague, lacking professional awareness and professional habits. The unreasonable curriculum system, the backward classroom teaching content and method, and the deviation of professional education from innovation and entrepreneurship education will directly affect the cultivation and development of students' innovation capacity.

B. *The Production-study-research Education in Colleges and Universities Is Faced with the Four Bottle Borders*

At present, there are four major bottlenecks facing innovation and entrepreneurship, and production-study-research education: the cultural atmosphere of serving the society is not strong; there is a gap between the characteristics of the discipline and the development direction of the industry; the positioning of scientific and technological innovation is not accurate, and the conversion rate of scientific research achievements is low; synergy mechanism of "production-study-research" for innovation and entrepreneurship is in absence. There are many reasons for this dilemma.

First, most local colleges and universities position themselves as teaching-oriented colleges and universities, and taking teaching rather than scientific research as their main task. Research is the key link in the "production-study-research" integration, the absence of which will make the chain between industry, university, research and application unable to be formed. So it is difficult to form a mutually reinforcing internal cycle and achieve integration.

Secondly, the competent organizations of affiliated colleges and universities are mostly competent authorities of the industry and thus have an advantage of grasping industry trends and obtaining projects and can get a lot of input in terms of hardware and software construction from competent authorities. Such is not something that local universities can match and catch up.

Third, most local universities are located in the non-provincial fourth and fifth tier cities, and it's difficult for them to attract high-end talents.

Fourthly, weak market demand for achievement transformation, poor implementation environment, closed management and poor mechanism are also important influencing factors. Although colleges and universities have the functions of teaching, scientific research and social service, the most fundamental function is still in teaching, that is, talent training. Students are the most fundamental subject and center of various activities in colleges and universities, and the construction of production-study-research system is no exception.

In the face of college students' innovation and entrepreneurship education in the initial stage and the bottlenecks facing the development of production-study-research education, the combination of innovation and entrepreneurship and production-study-research education system, just can improve and make up for the shortcomings of both. Innovation and entrepreneurship education in colleges and universities should have direction and it should be multi-directional. And the integration of production, study and research is one of the directions. The combination of production, study and research is an important way to cultivate innovative and entrepreneurial talents. Applying what they learn will undoubtedly improve the ability of university students to innovate and start their own businesses. Combining the education and entrepreneurship education with the production-study-research integration enables students to conduct innovative and research-based learning, and realize entrepreneurship through industrializing the study and research achievements so that they can experience the joy of innovation and research-based learning while making profit, which is a win-win situation. This is also an important achievement of the integration of production, study, research and application in university, which is triple-win. Therefore, it is necessary to construct the system of university innovation, entrepreneurship, and production-study-research.

IV. CONSTRUCTION AND PRACTICE OF UNIVERSITY INNOVATION, ENTREPRENEURSHIP AND PRODUCTION-STUDY-RESEARCH EDUCATION SYSTEM

A. *Establishing an Education System of Innovation, Entrepreneurship and Production-study-research Focusing on "Two-use and Two-improvement" "Integration of Creativity, Innovation and Entrepreneurship"*

"Two-use and two-improvement", refers to entering the campus by use of the needs of enterprises and industry background to promote college teaching reform, and entering

the enterprise by use of theoretical knowledge to improve the quality of enterprise personnel training; "integration of creativity, innovation and entrepreneurship" means the integration of the business planning-oriented creativity, technology-oriented innovation and enterprise practice-oriented entrepreneurship. The university should integrate the resources of "college creative park, science and technology innovation park, and social entrepreneurship park", build a "trinity" education platform, and integrate the concept of "integration of creativity, innovation and entrepreneurship" into professional education. At the same time, colleges and universities carry out talent cultivation mode reform on the basis of the combination of innovation, entrepreneurship and production-study-research education system focusing on "two-use and two-improvement" "integration of creativity, innovation and entrepreneurship". They should introduce enterprises into schools and combine teaching, innovative training and scientific research with technological application, and industrial development. Colleges and universities should build a collaborative linkage with industries and enterprises to jointly revise the talent training program according to social talent capacity needs, combine the curriculum system, practical training system and ability training, so as to build a training system for college students' innovation and entrepreneurship ability through school-enterprise cooperation.

B. Building the Practice Base of "Two-use and Two-improvement" "Integration of Creativity, Innovation and Entrepreneurship"

Colleges and universities should improve students' practical application ability and entrepreneurship and innovation ability through students' combination of theory and practice. The innovation and entrepreneurship practice base of "two-use and two-improvement" "integration of creativity, innovation and entrepreneurship" can be constructed from four aspects. That is, getting to know practice through innovation and entrepreneurship, practical training in production, study, research and application, innovation and entrepreneurship training as well as entrepreneurial practice.

1) *Getting to know practice through innovation and entrepreneurship*: Colleges and universities should conduct engineering knowledge training by getting students know practice base in campus and combining school-enterprise cooperation with the practice base to stimulate students' interest in learning, broaden students' horizons, combine the forefront of industrial development with students' learning, innovation and entrepreneurship development. This will boost the overall quality of students and cultivate students' awareness of innovation, entrepreneurship and spirit.

2) *Practical training in production*: Practical training in production means combining teaching practice with production practice and applying the professional knowledge to solve the problems in production practice. At the same time, tutors from universities and enterprises should guide students to solve the problems that need to be solved in the industrial upgrading and transformation, so

that teachers and students can do real work on real problems. Attention should be paid to interdisciplinarity and tutors should guide students to apply their comprehensive abilities, and obtain a new starting point for innovation and entrepreneurship in the practice process of industry-university-research application.

3) *Innovation and entrepreneurship training*: Innovation and entrepreneurship training means that on the basis of industry-university-research-application practice, using enterprise and social resources, instructing teachers' professional knowledge, cutting-edge theoretical advantages, technical achievements transformation and industrial production technology transformation, students further carry out technological innovation and application of theoretical knowledge and gradually launch innovative and entrepreneurial undertakings.

4) *Entrepreneurial practice*: Through in-depth cooperation with enterprises, universities should create a teaching atmosphere with a real entrepreneurial environment, carries out teaching activities for entrepreneurial projects, and achieves a close combination of "teaching", "learning", "doing" and "creating". Therefore, students can make use of the enterprise integration, situational, practical integration of industry and education innovation and entrepreneurship education platform for entrepreneurial practice.

C. Building a Three-level Innovation and Entrepreneurship Curriculum System

Universities should focus on their school-running characteristics according to the direction of talent training and training objectives; conduct in-depth integration of industry and education through the combination of industry, education and research; and construct a course system according to the ability requirement. They should improve the curriculum system by building a curriculum system with coordinated and unified basic and professional capabilities as well as development and innovation capabilities. It is also necessary for them to discuss with other universities and industry experts, actively contact relevant enterprises and institutions, and extensively listen to the opinions of relevant staff with rich practical experience in enterprises and institutions. On this basis, talent training mode should be reformed to form a new curriculum system of "basic theory + technical training + innovation and entrepreneurship practice". It is also needed to combine professional education with innovation and entrepreneurship education, strengthen practical application and enhance practical teaching contents such as professional practice, production training and engineering innovation. They should develop innovation and entrepreneurship courses, integrate innovation and entrepreneurship education into the whole process of talent training from basic knowledge to professional education and promote students' all-round development and success through innovation and entrepreneurship education. [1]

D. Building a Multi-dimensional Platform for Innovation and Entrepreneurship Practice

Based on the concept of collaborative education of industry-university-research-application, a fully open collaborative education platform covering the whole process of talent cultivation should be built, including five dimensional collaborative education platforms of innovation and entrepreneurship experience, innovation research and training, discipline competition incubation, achievement transformation, entrepreneurship incentive and incubation. On the innovation and entrepreneurship experience platform, activities like special lectures, innovation and entrepreneurship reports, theme salons, innovation and entrepreneurship lecture halls, visits to enterprise production lines, etc. can be held by enterprise technicians, innovation experts, and entrepreneurship tutors, so that students' professional skills and innovation ability can be broadened and students' innovative and entrepreneurial spirit can be cultivated. The innovation and entrepreneurship platform can be built relying on college students' innovation and entrepreneurship training plan, innovation and entrepreneurship team, and teacher's studio. Universities should give full play to their intellectual advantages, carry out innovative research and training with the help of enterprises' upgrading and optimization, scientific research and innovation projects, and do real work on real issues, so as to improve students' pioneering and innovative abilities, as well as their comprehensive application and teamwork skills. They should adhere to the purpose of "promoting learning through competition, promoting innovation through competition", establish a discipline competition incubation platform combining industry-university-research-application, and conduct innovative ability training for students driven by competition; through school-enterprise cooperation, integrate frontier disciplines and new industrial technologies into competition incubation training by a team of tutors composed of technical personnel from universities and enterprises guided by the principle of combining theory with practice; provide students with practice competition of different main lines and levels, form a student competition echelon so as to promote the sustainable scientific development of discipline competition and the comprehensive quality of students. Relying on the transformation of scientific and technological innovation achievements and enterprise resources of the university, the platform for the transformation of achievements should be established to deeply integrate scientific research, industrial development and market development. Policies, market demand information, human resources, technical services and other information required for achievement transformation should be timely disclosed to accelerate the transformation and promotion of scientific and technological achievements, stimulate students' enthusiasm for innovation and entrepreneurship, and promote regional scientific and technological innovation and economic development. It is necessary to strengthen R & D innovation, encourage entrepreneurship incubation and start from the characteristics of e-commerce entrepreneurship to build a variety of e-commerce entrepreneurship platform "network service platform + association/government departments + school-

enterprise cooperation platform". Universities should encourage students to make full use of taobao and other online service platforms to open online stores and improve their project operation ability; through cooperation with typical enterprises, enable students to participate in it and exercise their practical ability; and through the joint efforts of the university and the enterprise, train students as the pillar of the operation and give full play to their abilities in all aspects.

V. CONCLUSION

The cultivation of innovative and entrepreneurial talents in colleges and universities is a systematic project. And it is the way to realize the win-win situation of university and enterprise to construct the education system of innovation, entrepreneurship and production-study-research. This is conducive to the development of demand-oriented talent training programs in colleges and universities, the set of innovation and entrepreneurship textbooks and courses more in line with the actual needs of talents for social and economic development, and the cultivation and training of innovation and entrepreneurship teachers and college students' innovation and entrepreneurship practice ability, as well as the incubation of innovation and entrepreneurship projects. In addition, enterprises can better share the scientific and technological services and intellectual support of the advantages of colleges and universities, increase the competitiveness of enterprises, promote the upgrading of enterprises, and provide convenience for the talent reserve of enterprises, so as to achieve a win-win situation for universities and enterprises.

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