

Research on Innovation and Entrepreneurship Education Reform of Energy and Power Engineering

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Abstract—With the introduction of innovation and entrepreneurship education, all institutions are constantly following the footsteps. At this stage, we will focus on cultivating and developing energy conservation and environmental protection, new generation information technology, biology, high-end equipment manufacturing, new energy, new materials, new energy vehicles, etc. industry. It can be seen that the development of strategic new emerging industries is inseparable from the participation of energy and power engineering. Actively exploring new modes of training innovative and entrepreneurial talents is a major measure to promote China's transition from a large engineering education country to an innovative education power. This article summarizes the foreign innovation and entrepreneurship education model and experience. Taking the energy and power engineering major as an example, it proposes to work on personnel training programs, innovation and entrepreneurship education curriculum system construction, innovation and entrepreneurship practice base for university students, and innovation and entrepreneurship discipline competition. Conduct research on innovation and entrepreneurship education reform in energy and power engineering to promote the cultivation of innovative and entrepreneurial talents.

Keywords—*Innovation and Entrepreneurship, Energy and Power Engineering, Educational Reform, Research*

I. INTRODUCTION

The cultivation of innovative and entrepreneurial college students is an important measure for China's higher education to face the society and adapt to the integration of international market economy, and it is also an objective requirement for building a modern innovative country. The construction of a modern, innovative country depends mainly on the scale and quality of innovative and entrepreneurial talents. Innovation and entrepreneurship education in colleges and universities is the cornerstone of national innovation and entrepreneurial talent cultivation and plays a decisive role. The innovation and entrepreneurship of college students is the key to solving the employment problem and has made great contributions to the promotion of social prosperity and development. As an important part of building an "innovative" country, innovation and entrepreneurship education has been upgraded to a key construction project by the state. Implement innovative and entrepreneurial education, and strive to By 2020 , China will be built into an "innovative" country, making the development of science and technology an engine of national and social progress. In order to enhance the awareness, ability and quality of college students' innovation and entrepreneurship, the Ministry of Education has successively launched construction projects such as the "College Student Entrepreneurship Competition" and "College Students' Innovation and Entrepreneurship Training". Energy and Power Engineering students through theoretical and practical aspects of teaching combined with the basic ideas and the ability of systems engineering, systems design capabilities, the ability to implement the system capacity and system operation and maintenance. In terms of training mode, relying on the country's network power strategy "Internet +" action plan and big data strategy, it has broken through the traditional "singularization" and "homogeneous" mode, and built "diversification" and "personalization".

II. MODELS AND EXPERIENCES OF FOREIGN INNOVATION AND ENTREPRENEURSHIP EDUCATION

In order to improve the employment environment and opportunities for graduates, higher education should improve and cultivate the entrepreneurial skills and initiative of graduates. Graduates will no longer be job seekers, but will first become the creators and even providers of jobs. More than 400 colleges and universities in the United States offer a variety of entrepreneurship courses for undergraduates, while top universities such as Harvard and Stanford offer college students major courses and degrees in entrepreneurship. For example, the Babson Business School first opened its entrepreneurial direction in undergraduate education, Northeastern University opened the first undergraduate degree in entrepreneurship in the United States, and the University of Southern California established a master's degree in business administration. enter After the 21st century, the British government launched a university student entrepreneurship program, while Japan advocated entrepreneurship education in colleges and universities, and passed the "University Technology Transfer Promotion Law" in Congress to promote college students' innovation and entrepreneurial enthusiasm.

Baisan School of Business put forward the idea of "increase consciousness", which focuses on the innovative thinking mode and investment risk-taking spirit of college students in the process of entrepreneurship. In addition, it also tries to improve students' insight into market direction and market changes. By setting up forward-looking curriculum design, constructing a complete curriculum content system, adopting an inquiring curriculum teaching method, and being equipped with powerful faculty members, Babson Business School has become the world's most famous innovation and entrepreneurship education institution and innovation and entrepreneurship education reform. The vanguard is a leader in innovation and

entrepreneurship education.

Stanford's "Integration of Production, Study and Research" innovation and entrepreneurship education model focuses on the mutual conversion between practical application and basic scientific research, pursuing first-class teaching and scientific research results, creating an open and interactive innovation and entrepreneurship education, and establishing a university-business relationship. The interactive and mutually beneficial relationship between the science and technology industrial parks, together with the entrepreneur's personal capabilities, specialties, and the social environment in which they are located, plan the entire entrepreneurial system process from the perspective of the entrepreneur.

III. THE CHALLENGE OF THE DOMESTIC INNOVATION AND ENTREPRENEURSHIP EDUCATION CURRICULUM

A. Innovative Curriculum Knowledge.

From the school level, the curriculum of innovative practical activities is still not perfect. There are many bibliographies for practical courses, but the contents are usually less theoretical and practical, and they cannot fundamentally improve students' abilities in innovation and entrepreneurship.

B. Innovation Base.

Colleges and universities cannot establish a practical base based on the constraints of conditions and sites. The nature of innovation is a practical activity, and innovation is also formed in practice. The shortage of practical bases restricts the development of innovative entrepreneurship courses.

C. Students' Knowledge System.

From the perspective of the student's knowledge system, the university's knowledge system is often a tower structure, the second is to learn the basic knowledge; the third year is to study the professional foundation course; the fourth is to study the professional course. This kind of knowledge system causes students' problems after employment, that is, the foundation of university study and professional basic knowledge are not impressed. Most of the knowledge does not play a role in practice, resulting in a large amount of time, energy and school resources.

D. Students Subjective Initiative.

Students' subjective initiative is not conducive to the development of innovative courses. There are two main reasons for lack of initiative: on the one hand, the risk of entrepreneurship is huge. According to incomplete statistics, the success rate of entrepreneurship is less than 10%. Therefore, most students are reluctant to start a business and directly influence class, the students attitude; on the other hand, the impact of innovation and entrepreneurship courses to students without a profound understanding of, select this course is to complete the required credits, therefore, lack of knowledge led to the initiative is not high.

IV. THE ENERGY AND POWER SPECIALTY IS THE BASIS FOR THE DEVELOPMENT OF STRATEGIC EMERGING NEW ENERGY RELATED INDUSTRIES

The development of strategic emerging industries such as new energy disciplines and engineering needs to be based on traditional dominant disciplines. The foundation and development status of traditional industries will affect the formation and development of strategic emerging industries. The development of strategic emerging industries will also receive help from the development of traditional industries. The energy and power specialties are mostly related to traditional industries, and the new energy science and engineering majors are involved in strategic emerging industries. Therefore, the development of energy and power specialties directly affects the development of new energy and new energy science and engineering majors.

The new energy science and engineering majors cover a wide range of disciplines, including interdisciplinary subjects, including physics, energy and power engineering, electronic science and technology, automatic control, materials science, mechanical engineering, and chemistry. The new energy science and engineering major is a typical multidisciplinary cross-disciplinary program and strongly relies on the development of engineering technologies such as energy and power engineering. The basic discipline is the source of the development of new disciplines, especially interdisciplinary and emerging disciplines. The development of strategic emerging new energy industry and new energy science and engineering is inseparable from the energy and power majors that gave birth to them. The energy and power majors serve as the foundation and source of their development, and provide the development of new energy science and engineering.

The curriculum of new energy science and engineering majors at home and abroad has something in common with the setting of energy and power engineering. For example, fluid mechanics, engineering thermodynamics and heat transfer are the basic courses. The talent training curriculum system of new energy science and engineering majors that have been established in China shows that most of the training programs reflect the discipline foundation of energy and power majors (including fluid mechanics, engineering thermodynamics, heat transfer, etc.), and new energy science and engineering majors. The requirements for setting up a special program for energy and power are consistent.

Most of the new energy science and engineering majors in most universities in China are based on the original energy and power majors. The energy and power majors are the foundation for the development of strategic emerging new energy-related industries and new energy science and engineering. Therefore, it is necessary to further discuss talent construction in energy and power engineering.

V. RESEARCH ON INNOVATION AND ENTREPRENEURSHIP EDUCATION REFORM IN ENERGY AND POWER ENGINEERING

According to the new orientation of “first-class comprehensive research university with rational layout and distinctive features” and the strengthening of “coordinating the development of scientific and engineering talents training models, and strengthening the integration of scientific research, education, and engineering practice bases, with a regional demonstration role” The concept of running a school, the energy and power engineering major has been following the "high-level projects for engineering, innovation, full-time interaction, coordinated development", and has been trained in talent training programs and innovations. Work has been carried out on the establishment of the entrepreneurship education curriculum system, the construction of college students' innovation and entrepreneurship practice base, and the innovation and entrepreneurship discipline competition.

E. Establish Training Model Cross-Industry, Cross-Cutting, Interdisciplinary Collaboration

The integration of educational resources for the energy and power majors, cooperation with new energy related industries on the basis of cultivating regular energy and power related talents, training of cross-industry talents, and cooperation with fields other than energy and power, such as chemical engineering and materials disciplines Biomass energy efficient use of professional and technical personnel related to new energy materials. Establishing a talent training model for universities and enterprises, research institutes, and foreign universities. The training of joint talents in universities and enterprises is mainly to enable undergraduate talents to be trained in the undergraduate talents who understand both theoretical expertise and rich practical engineering experience. The second tutor allows undergraduates to get practical engineering knowledge training during the graduation design phase, learn how to combine theoretical knowledge with practical engineering to solve practical engineering problems, and learn how to transform knowledge into productivity.

F. Opening an innovative and entrepreneurial course

The purpose of the Innovation and Entrepreneurship Program in Energy and Power Engineering is to update and transform the traditional curriculum model and content, and to establish a curriculum system that is more suitable for innovative entrepreneurial talents. On the basis of in-depth discussions, the School of Mechanical Engineering and the School of Business have offered three types of elective courses for undergraduate students in energy and power engineering: general courses (introduction), interdisciplinary courses (applications), promotion and research courses (research), through the establishment of the above courses to enhance college students' entrepreneurial motivation, awareness, concept and passion.

G. Construction of an innovative entrepreneurship practice base

As an emerging subject of scientific and technological innovation, the Innovation and Entrepreneurship Practice Base has become an important support platform for the cultivation of innovative and entrepreneurial talents, and also a carrier for maximizing the benefits of “production, study and research”. The energy and power engineering majors have signed cooperation agreements with a number of high-tech enterprises to cooperate in research, production, and research. Within the framework of “Technological Innovation and Internet + Sales Platform”, the two parties exert their respective advantages in production and scientific research and jointly develop new technologies and products. Co-cultivating students' innovative ability.

H. Actively participate in the innovation and entrepreneurship competition

Encourage college students to participate in academic competitions, expand the participation of university students in national and national competitions in mechanical and energy disciplines, and focus on supporting competitions such as Internet +, innovation and entrepreneurship competitions that emphasize comprehensive capabilities. The students of energy and power engineering organizations participated in the 2nd China Internet + College Student Innovation and Entrepreneurship Competition, the National College Student Industrial Design Competition, the National College Student Machinery Product Digital Design Competition, the National College Student Mechanical Innovation Design Competition and other large-scale innovation and entrepreneurship competitions. And actively participate in the application of national and regional-level "big plan" innovation and entrepreneurship projects.

VI. CONCLUSION

The practice of innovation and entrepreneurship is an important way to improve the ability of university students to practice innovation. It needs to permeate the practice of university practice. The cultivation of innovative and entrepreneurial talents in energy and power engineering must establish a forward-looking concept of innovation and entrepreneurship training, build a multi-level innovation and entrepreneurial talent training model, and focus on curriculum reform and talent training program reform based on engineering and other interdisciplinary resources. The combination of innovation and entrepreneurial talent training mechanism to cultivate innovative entrepreneurial talents that meet the needs of the contemporary society.

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