

Study of Problems and Solutions in Innovation and Enterprise Education of Engineering Specialities

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Abstract—It is the need of higher education reform and development and the requirements of economic development to train creative high quality talents. In colleges, to carry out innovation and entrepreneurship education for the engineering specialty for the status of domestic innovation and entrepreneurship education in colleges and the main problems, it must actively explore the feasibility of training innovation and entrepreneurship skills combined with the characteristics of the engineering discipline. The measures must be proposed from the educational philosophy of innovation and entrepreneurship, building a sound innovation and entrepreneurship education curriculum, strengthening teachers construction, the practice teaching and innovative activity guidance, to actively explore the new sustainable development model of innovation and entrepreneurship education.

Keywords—*engineering specialities; innovation and enterprise education; innovation spirit; entrepreneurial ability*

I. INTRODUCTION

From the trend of higher education reform and development, the sustainable development of higher education includes scale development and quality improvement, and quality development is the main task. Innovation and entrepreneurship education integrates the whole process of personnel training, whose core is to cultivate the innovation spirit and entrepreneurial ability, reform personnel training mode and educational content, combine personnel training, scientific research with social services closely, achieve the transformation from the emphasis on knowledge to ability and quality, and improve personnel training quality.

It conforms to the reform and development requirements of higher education to carry out innovative entrepreneurship education, and it is the lifeline of higher education. The quality of personnel training is the core of higher education

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quality [1]. It conforms to the requirements of applied talents training or carry out innovative entrepreneurship education, which cultivates applied talents for the society and local economic development maximum [2]. It will help alleviate the employment pressure of college students from passive employment to active entrepreneurship, and improve the competitiveness of college students. It promotes social and economic development, supports and promotes the establishment of national innovation system effectively. It helps the realization of student self-worth, which is the basic requirement of college student growth of the times, and the essential quality of college students.

II. THE PROBLEMS OF CARRYING OUT INNOVATION AND ENTREPRENEURSHIP EDUCATION

A. Innovation and entrepreneurship education idea is not mature enough

The universities do not the nature of innovation and entrepreneurship, and have misunderstandings for the innovation and entrepreneurship education. Some people think that entrepreneurship education is to teach students open company and be the boss, and make vulgar understanding for the innovation and entrepreneurship education, which makes the entrepreneurial activity in the utilitarian level of wealth and profits, but not rise to the rational level and value height based on social responsibility.

Some people think that the graduates starting their own business are very few, and it is the matter after graduation, so it is less demand and sense to carry out entrepreneurship education in colleges. Colleges, teachers and students lack a mature concept of innovation and entrepreneurship education, which often ignores the culture of innovation, but too limited to imparting knowledge, and does not help to improve the overall quality of students [3].

B. Innovation and entrepreneurship curriculum system is not perfect

The scientific curriculum system is not only the platform and support of innovation and entrepreneurship education, but

also one of the most important means achieving teaching goal. At present, innovation and entrepreneurship education in China is still in the initial stage, lacks scientific system, such as the lack of scientific curriculum setting, authoritative teaching system construction and unified theory and practice teaching, and curriculum evaluation mechanism is single.

It is relatively small to add the entrepreneurship education curriculum into the compulsory course, more is included into the elective courses. The course type is single, teaching methods is not diversity, curriculum and practice disjoint, only focus on book teaching, ignores practical operation, which can not arouse enough attention of the teachers and stimulate students' desire for knowledge, so it can not really cultivate innovative talents. [3]

C. *The resources of innovation and entrepreneurship lack of integration*

Recently, the colleges gradually increase investment in education of engineering practice, add practice teaching base, laboratory, practice facility and other hardware facilities, which provides favorable conditions for students enhancing practice and innovation ability, however, it is can not be ignored that the utilization rate of experimental training resources and practice teaching base is not high.

With enrollment in recent years, teachers shows young trend, most of the young teachers enter the colleges after graduation, neither has social experience, nor hands-on ability. In the actual teaching process, they often pay more attention to theory than practice, so the students lack practical ability and problem-solving skills, and can not meet the talent needs of the knowledge economy era.

D. *Innovation Education and Enterprise Education Separate*

Universities increasing emphasis on education of innovation and entrepreneurship, but innovation education and entrepreneurship education separate, engineering specialty focus on innovation, ignore entrepreneurship. Students mostly make invention in the lab, but not contact entrepreneurship education. Students of economic management emphasis on entrepreneurship education, but ignore innovation education, such as business incubator, business competitions, seminars.

The innovation education and entrepreneurship education can not be separated, innovation and entrepreneurship is not simply summed by innovation education and entrepreneurship education, but contains a new kind of educational theory, education system and educational practices. Only the students creative thinking, innovation and entrepreneurship education are organically integrated, can it achieve the purpose of innovation and entrepreneurship education.

E. *Innovation and entrepreneurship education and professional education out of touch*

With the deepening of innovation and entrepreneurship education, the colleges are starting to open innovation and entrepreneurship courses successively, but the courses and the professional education are disjointed. Professional education runs it by position, embodies *small, narrow, special*, but the

innovation and entrepreneurship education emphasis on the overall, using the professional knowledge to complex real environment. Professional education is the theoretical basis of innovation and entrepreneurship, innovation and entrepreneurship education is professional training guide.

III. TO CARRY OUT THE IDEA OF INNOVATION AND ENTREPRENEURSHIP EDUCATION

A. *Update idea and establish culture awareness of innovation and entrepreneurship*

Philosophy determines the direction of entrepreneurship education. Innovation is the soul of the nation. The fundamental objective of the implementation of innovation and entrepreneurship education is not only to alleviate the current employment pressure, but also should stand the height of cultivating talents for the society, focus on the culture of innovation and entrepreneurship consciousness throughout the nation, penetrate the innovation and entrepreneurial into the nation spirit.

Therefore, we must strengthen the study and research, go forward with time, update teaching philosophy, put innovation and entrepreneurship education into the field of quality education and professional education, integrate into the training program of colleges, implement the whole process of education, make the innovative spirit, practical ability and entrepreneurial spirit as the basic position.

The innovation and entrepreneurship education is not just carried by the course itself, but should integrate into the general curriculum, professional course and all the procedures of the entire education. Innovation and entrepreneurship education should be fit into the normal teaching program, and be clear in program position, class period, main contents, teaching methods, to ensure the effectiveness and wide coverage of innovation and entrepreneurship.

B. *People-oriented and build education curriculum system of innovation and entrepreneurship*

It needs to rely on effective curriculum support for students innovation and entrepreneurship from educational philosophy to practice. The scientific curriculum system is the key to innovation and entrepreneurship education. Innovation and entrepreneurship course will firstly reflect the education goals, tasks and requirements, and then the innovation and entrepreneurship courses should combine with the professional curriculum organically.

In the implementation process, engineering specialty should take curriculum reform for the professional characteristics, build the curriculum system of organic integration between innovative entrepreneurship courses and curriculum system, effective connection between innovation and entrepreneurship practices and professional practice.

Particularly, we should emphasis on scientific and reasonable setting of innovation and entrepreneurship education curriculum, increase selective and flexible curriculum courses, open public elective courses, increase the proportion of elective courses in the curriculum, strengthen the

practicality and guidance of the course, meet the needs of students, broaden their horizons, and enrich students' knowledge architecture. On the base of setting up the compulsory course, professional courses should penetrate into the innovation and entrepreneurship education, to improve the quality and awareness of students' innovation and entrepreneurship [4].

C. Cooperate between colleges and government, and build teacher teams of innovation entrepreneurship education

The teaching way of training personnel should transfer from knowledge teaching model to innovation and entrepreneurship. The highly qualified teacher is to determine the success of innovation and entrepreneurship education. According to the current successful practice of domestic and international innovation and entrepreneurship education, the teachers should consist of theory teachers, practice teachers, full-time teachers and part-time teachers.

Firstly, to train awareness of innovation and entrepreneurship of teachers, invite the experts to carry out education seminars, and strengthen the sense of innovation entrepreneurship.

Secondly, to strengthen the teachers' professional training, and select teachers to participate in the training course organized by the nation of colleges [5].

Thirdly, to let the teachers work in the enterprise, experience the entrepreneurial process, access the first-hand information of enterprise management and operation and improve the ability of teachers.

Fourthly, to hire some outstanding entrepreneur, technology experts, government officials or persons with entrepreneurial experience as part time teachers, to compensate for the lack of teachers in higher educational deficiencies [6].

D. Strengthen the practice and improve the education quality of innovation and entrepreneurship

Practice is the source of innovation, practice teaching is the platform of cultivating the innovation spirit and entrepreneurship ability. To understand correctly the purpose and function of practice teaching, adjust the position and role of practice teaching in personnel training system, develop practical teaching outline and practical teaching evaluation system according to engineering application personnel training requirements, standardize the practice teaching content, carefully design teaching procedure, update teaching tools and methods. In teaching activities, to strengthen teaching summary of practical teaching and experience exchange, and explore new teaching models application to innovation and entrepreneurship.

In colleges, the comprehensive test programs and specialized courses should be opened to make students get enough basic skills training, professional experimental courses to cultivate innovative ability, comprehensive test courses to train teamwork ability. Outside the campus, the level of college-enterprise cooperation should be deepened, the construction of experimental teaching base should be

strengthened, to develop and improve the cultivation plan for the students' practical and innovative capabilities with the enterprises. So that students not only learn something, but also learn for practice, and cultivate the engineering and innovation ability [7].

E. Build the platform to enhance student accomplishment of innovation and entrepreneurship

To vigorously carry out scientific and technological innovation activities, and organize students to participate in innovation competition and project is an important way to implement teaching and education quality project, training high-quality personnel of comprehensive development with innovative spirit and practical ability [8]. Colleges should set the open laboratory, equipped with professional instructors, build multi-level platform of science and technology innovation contest, let students give full play to the initiative, thereby forming a small research team to obtain innovation ability in academic competitions, college students innovation experiment, extracurricular academic contests, skills competitions and all types of innovation projects.

Through a series of competitions, we cultivate students' innovation awareness, improve the ability in all aspects, encourage students to actively participate in science and technology innovation contest and various academic activities, and guide students to set up science and technology associations and societies with a certain subject characteristics, so that more students can participate in scientific and technological innovation activities to improve their innovative ability, increase practice opportunities, broaden their horizons, strengthen the innovation sense, and enhance their innovative ability.

IV. CONCLUSIONS

It is the requirements of history and the call of the times to train students' innovation and entrepreneurship ability. To carry out innovation and entrepreneurship education and cultivate awareness of innovation and entrepreneurship is a measure of serving for the innovative nation, and an important way to deepening the higher education reform and training innovation and entrepreneurial talents meeting the social needs.

As the main force of training application professional personnel, the engineering specialty should actively carry out innovation and entrepreneurship education, explore new forms of innovation and entrepreneurship. to carry out innovative and entrepreneurship education, colleges must update educational philosophy, establish a reasonable education system and assessment mechanism, and construct a teacher team to meet the education needs.

At the same time, it should reflect the integration of professional education and humanities education, combination of professional education and humanities education, and build a good operating environment and effective platform. Only in this way, can it effectively change the training model, improve the personnel quality, expand students' creative ability, professional ability, practical ability and entrepreneurial ability, to adapt to the talents needs of economic development.

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