

Research on Entrepreneurship and Innovative Talents Training Mode in Computer Majors Against the Background of New Engineering

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Abstract—The innovation and entrepreneurship education is one of the necessary steps for cultivation of outstanding engineering talents. It has been developed rapidly, and needs to meet constant reform requirements against the background of new engineering. Due to the expansion of enrollment, the scale of computer science students is extremely expanding. It is a consensus that all colleges and universities should face in cultivating computer professional innovation and entrepreneurial talents. This paper analyzes the bottleneck faced by computer majors in the cultivation of innovative entrepreneurial talents, and puts forward the strategies of transforming traditional computer teaching mode and cultivating entrepreneurial and innovative talents against the background of new engineering.

Keywords—new engineering; computer science; entrepreneurship; innovation; talent cultivation

I. INTRODUCTION

The Made in China 2025's impact goes beyond the economic sector to the educational realm, and involves references to education reform including entrepreneurship education (EE) in China. In 2017, in response to the challenges of the new round of scientific and technological revolution and industrial transformation, we will actively serve the national innovation-driven development and the implementation of the 'The Belt and Road' (Silk Road Economic Belt and the 21st-century Maritime Silk Road, is a development strategy adopted by the Chinese government involving infrastructure development and investments in countries in Europe, Asia and Africa.), 'Made in China 2025' (an important 10-year national plan, that outlines China's objectives in future economic development, and the future directions for China's EE) and 'Internet Plus', accelerate the reform and innovation of engineering education, and cultivate and create a large number of diverse and innovative engineering and engineering talents support the transformation and upgrading of the industry. On the basis of the 'Excellent Engineer Education and Training Program', the State has proposed a major action plan for the continuous deepening of engineering education reform — 'New Engineering Construction'.

On September 18, 2018, the State Council of China issued the "Opinions on Promoting the High-quality Development of Innovation and Entrepreneurship to Create an Upgraded Version of 'Entrepreneurship and innovation'". The opinion clearly stated that the demonstration bases of universities and research institutes should fully tap the human and technical resources, promote the transformation of talent advantage and scientific and technological advantages into industrial advantages and economic advantages, focus on improving the cultivation and flow mechanism of entrepreneurial talents, accelerate the transformation of scientific and technological achievements, build a support system for college students' entrepreneurship, and establish and improve a supportive service system for dual-generation.

In the context of new engineering, along with the development of new technologies such as the Internet, Internet of Things, big data, artificial intelligence, new materials, new energy, etc., the theoretical knowledge level of engineering teachers and students has been continuously improved, have also undergone tremendous changes with the new business model. Innovation and entrepreneurship have become a new impetus for social development. How to further strengthen innovation and entrepreneurship education in colleges and universities and focus on improving the ability of college students to innovate and innovate is not only an inevitable requirement of economic and social development, but also an inevitable demand for the cultivation of higher education talents.

According to the "2015 Graduates' Employment Research Report" released by Zhaopin (one of the leading generalist job board in China), the proportion of self-employment graduates who participated in the survey from 2013 to 2015 was 6.3%. The success rate of entrepreneurship is only maintained at 1.8%. In 2007, the proportion of graduates choosing to start a business has dropped slightly compared with last year, accounting for 6.3%. It is imperative to strengthen the transformation of entrepreneurial and innovative talent education models in the context of new engineering.

Since the start-up of China's entrepreneurship and innovation education is still late, it is still in a state of exploration and there are many problems that need to be solved. Firstly, the theory lacks new ideas and is out of touch with practical applications. Secondly, the research content is insufficient and there is a lack of systematic and in-depth research. Finally, under the background of new engineering, there is still less research on how to apply the powerful advantages of advanced technology to 'Entrepreneurship and innovation' education, especially for computer majors.

The main purpose of the new teaching model research is to integrate the concept of new engineering into the process of innovation and entrepreneurship education for computer majors, and strive to cultivate students' innovative consciousness, innovative spirit, innovative thinking and innovative ability, and by changing the teaching curriculum and methods to cultivate students' entrepreneurial ability, to better explore the students' own potential, and enable students to have the basic ability of 'Entrepreneurship and innovation' talents, so that students can change from the position of the seeker to the position of the creator.

In Section II, the authors will introduce the research status of entrepreneurship and innovation talents training in university. The main bottlenecks of entrepreneurship and innovative talent training in computer majors will be analyzed in section III. The section IV will give coping strategies, and Section V is the conclusion.

II. OVERVIEW OF ENTREPRENEURSHIP AND INNOVATIVE EDUCATION

Since the 1980s, entrepreneurship education in foreign countries is becoming increasingly popular and forms a strong upsurge. Before this, in 1947, Harvard Business School took the lead in launching the Entrepreneurship Program for New Entrepreneurship Management. In 1949, Stanford University began its education on innovation and entrepreneurship. In the teaching course of the Baccalaureate Business School after 1960, a large number of analysis cases of actual cases of enterprises were added. By analyzing the business models, management methods and management structures of some successful enterprises, Baccalaureate Business School summarizes this successful experience and provides students with relevant reference. In 2014, Money magazine ranked Baccalaureate Business School as the best university in the United States. However, in recent years, foreign researchers have not paid too much attention in the research of entrepreneurship education. Almeida [1] proposed that a major feature in the process of building an entrepreneurial university is the complementary interaction between university, industry and government (the three helices). Doboli [2] developed six entrepreneurship modules spanning required and elective courses in all four years of study, as follows: Data structures and algorithms (required, freshman), Introduction to computer architecture (required, sophomore), Computer graphics (elective, junior/senior), Computing, ethics and society (required, junior), Software engineering (required, senior), and Computer gaming (elective, senior).

Although domestic 'entrepreneurship and innovation' education started late, it has become a hot topic in recent years. Bao [3] proposed the following Strategies: clarify the status and role of innovation and entrepreneurship education, build a scientific and perfect curriculum system, strengthen the construction of teaching staff, build a teaching system for innovation and entrepreneurship, and establish and improve the innovation and entrepreneurship guarantee system. Li [4] proposed strengthening ideological education and vocational guidance, constructing a curriculum system that combines engineering and learning to cultivate innovation and entrepreneurship capabilities, internships and other countermeasures. Du [5] proposes a student-centered 'teacher-enterprise-college-social' four-in-one '1+4' integration circle strategy. By constructing a curriculum system, a practical system and a support guarantee system through the integration of innovative entrepreneurship education and professional education, to promote the deep integration of them in universities. Wang [6] proposed to establish a full-scale education, from the first year to the fourth year, according to different stages and different levels to carry out targeted innovation and entrepreneurship education. That is, consolidate the basic education of the students' career planning in the first-grade stage, expand the quality education of the students' career-oriented orientation in the second year, consolidate the education of the students' basic professional quality in the third-grade stage, and deepen the employment education of the students' willingness to choose their careers in the fourth year. Gu [7] researched the innovation and entrepreneurship talent cultivation mode in the agricultural university. He proposed that a good teaching practice platform should be constructed, innovation team should be formed and teaching staff construction should be valued, thus students' comprehensive quality can be improved to adapt to the fierce competition of the future society. Aiming at the existing problems of innovation and entrepreneurship education occupation colleges, Chen [8] presented an innovation and entrepreneurship-oriented training program from the talent training scheme, curriculum system, educational mode, platform construction, teachers' construction, system construction. In Specialty, Yang [9] shared some practical experience that the applied undergraduate colleges and universities should focus on how to put effort into training 'Internet Plus' innovative and entrepreneurial talents of e-commerce specialty. Bi [10] explored a new model of innovation and entrepreneurship education talents for material majors from the aspects of theoretical curriculum system platform, practical system platform and information platform construction. Fu [11] proposed that application-oriented colleges should reshape the concept of innovation and entrepreneurship education, improve the construction of teachers, build a campus innovation and entrepreneurship environment, and improve the innovation and entrepreneurship of computer majors.

III. THE BOTTLENECK FACED BY THE ENTREPRENEURSHIP AND INNOVATION TRAINING MODEL IN COMPUTER MAJORS

A. One-sided Emphasis on the Teaching of Knowledge

Entrepreneurship and innovative education must be integrated into professional education, and it is necessary to differentiate students' quality. The talents trained by computer science require students to have strong practical ability. Traditional teaching emphasizes the transfer of knowledge and pays less attention to the ability of students to discover, solve, and analyze problems, which limits the potential of students. Computer graduates lack the ability to innovate and start a business, lack work experience and project development capabilities, and find it difficult to find a job with a professional counterpart after graduation. What's more, recently, the innovative and entrepreneurial courses are mostly in the form of supplementary knowledge, which is outside the curriculum system. It lacks a complete, hierarchical and logical structure of innovative entrepreneurship education curriculum system.

B. Lack of Practice Ability

In the process of computer majors teaching, under the influence of traditional theoretical concepts, colleges attach importance to theoretical technology and classroom education, while ignoring extracurricular guidance and practical courses. Most of the teachers set the classroom theory as the focus of the teaching task. Due to the deviation of the teacher's teaching concept, the layout of the professional discipline is unreasonable, and the teaching methods are not scientific, so that most of the students trained can only 'paper talk', Lack of practical experience.

C. Knowledge Structure Is out of Touch with Society

With the development of computer science, the division of labor is becoming more and more detailed; the structure of knowledge is out of touch with society. The theory teaching knowledge is far from the 'Entrepreneurship and innovation' education teaching, which ignored training students' innovative ability, practical teaching and research development. Therefore, the ability to actively adapt to society has been affected and students are in an awkward position in the job market. At present, many colleges and universities have unreasonable places in the computer's courses. Many ordinary colleges and universities ignored the teaching in accordance with the time and their aptitude, leading to the disconnection between the content of the teaching and the need for a new engineering background for the computer majors. For example, the curriculum is not new enough in the analysis of big data. The intelligent traffic big data closely related to the society has not been analyzed and judged in the course teaching. The long-term closed school-running mode of colleges and universities has led to the separation of teaching from the actual needs of the society. In the process of cooperation with universities, enterprises are also more profit-oriented, lacking the atmosphere of common education and long-term mechanism.

D. Teaching Methods and the Level of Teachers Needs to Be Improved

The traditional teaching methods are mainly based on theoretical teaching. The boring class cannot raise students' interest and limit the potential of students. At this stage, most teachers are reluctant to take the 'comfort zone' with teaching mode, which is difficult to meet the requirements of innovation and entrepreneurship education. The double-position teachers (those who are teachers and technicians) are rare. Some teachers in the computer majors started to teach directly after graduating from school. So, they have no experience in social practice and lack experience in guiding students to practice innovation and entrepreneurship. Some college teachers are busy with teaching, while neglecting the updating of knowledge and the growth of experience. Some teachers have limited ability of development creativity. Therefore, it is difficult to cultivate high-quality talents with high potential and high computer skills. 'Entrepreneurship and innovation' education is not to let students go to start a business, but to cultivate talents with innovative entrepreneurial thinking. Therefore, teachers are basic required to have innovative entrepreneurial thinking and ability. Otherwise, it is difficult to export and cultivate students' corresponding qualities.

E. Students' Ideas for Entrepreneurship and Innovation Are Immature, and They Cannot Adhere to Their Entrepreneurial Ideals

In the era of big data in the rapid development of information technology, teachers and students need to recognize that innovation and entrepreneurship are increasingly demanding students' workplace literacy. On one hand, teachers should systematically lead and guide students who have innovative entrepreneurial ideas and analyze the reality of students' ideas. Because it is not clear for students whether it is feasible to start a business innovation idea, whether it can bring benefits to society, and whether it meets the needs of social development. On the other hand, some students are blind to the development potential of the project. How to better open up new horizons under existing projects requires college students to correctly position their ideas.

Compared with employment, the innovation and entrepreneurship education of undergraduate colleges lacks effective ways to cultivate the innovative and entrepreneurial ability of college students. Innovative entrepreneurship is not just to encourage students to imagine and to come up with new ideas. The cultivation of innovative thinking talents is also a systematic and standardized process. It not only requires students to have strong self-discipline and firm beliefs, but also requires effective training channels to systematically guide students.

Among the self-employed college students, due to the lack of funds, life tempering, industry norms and market prospects, the market opportunities and the positioning of the consumer groups often deviate, eventually leading to the failure of entrepreneurial projects, and ultimately have to give up their own entrepreneurial ideas.

IV. ADVICE ON COMPUTER MAJORS TEACHING MODE TRANSFORMATION AND ENTREPRENEURSHIP AND INNOVATION TRAINING

The cultivation and positioning of computer professionals needs to focus on national strategies such as 'Encourage people to do business creatively and drive innovation', 'Internet Plus', 'Big Data', etc., and continuously deepen the reform of computer science teaching, and Put the importance of innovative entrepreneurship education and professional education to the same level.

A. Computer Majors Teaching Transformation

Teachers need to add some innovative and entrepreneurial content in the classroom and teaching materials, actively set up compulsory and elective courses to train students' innovation and entrepreneurship ability, focus on improving students' sense of innovation and let students in this major clear their entrepreneurial goals.

For computer majors, practical ability is indispensable both in entrepreneurship and in employment. Teachers need to set more practical courses related to innovative entrepreneurial knowledge, which can be quickly adapted to computer students and is also conducive to improving students' thinking ability and promoting students' awareness of 'Entrepreneurship and innovation'.

The teaching plan should set practical projects with different levels of difficulty for students at different levels. This kind of teaching in accordance with the aptitude not only exercises the students' innovative ability and practical ability, but also avoids students' dislike of entrepreneurial innovation because of the difficulty of projects.

The teaching methods also should be modified in time. Through multiple channels, such as make the existing curriculum fully play its role, introduce the integration mechanism, lay the foundation for the construction of relevant subject groups, and organize the construction of a number of computer-based cutting-edge online open courses, students will be able to gain the development of professional frontier fields, and their application skills in the new engineering background will also can be improved.

B. Strengthening the Construction of Entrepreneurship and Innovation Faculty for Computer Majors

Building a high-quality faculty is also a top priority for cultivating innovative talents in computer science. It is necessary to gradually improve the mechanism for teacher's introduction, training and selection. A high-quality faculty majoring in computer should not only master the latest academic developments and scientific research achievement in the professional field, but also need master the basic knowledge and methods of innovation and entrepreneurship education. There are several strategies to create a high-quality faculty for computer majors: (a) establish a dedicated and integrated innovation and entrepreneurship education teaching team; (b) establish extensive contacts with various departments such as society, enterprises or government; (c)

make full use of various social resources and strive for financial and policy support; (d) organize computer majors teachers to participation in entrepreneurship training and various seminars in the computer field.

The colleges must work closely with various departments to jointly build a high-quality faculty in order to promote the development of innovation and entrepreneurship education and improve the success rate of entrepreneurship education.

C. Strengthening the Construction of Colleges Environment for Entrepreneurship and Innovation Education in Computer Majors

A good environment is an important prerequisite for implementing innovation and entrepreneurship education. Innovation and entrepreneurship education for computer majors should be combined with its own practice to practice entrepreneurial activities, with innovation and entrepreneurial competition as a carrier to stimulate the creative enthusiasm of teachers and students. To improve the computer majored students' entrepreneurial knowledge and skills, the colleges should strengthen the construction of an entrepreneurial reality environment.

The colleges can establish innovative and entrepreneurial interest groups, train a group of outstanding student groups with innovative ability and entrepreneurial impulse among computer majors, give them financial support and technical assistance similar to 'Angel Investment'.

The colleges also can launch a series of activities such as entrepreneurial ideas platform, to make students freely give full play to its innovative and entrepreneurial ideas, and inspire students' innovative spirit and entrepreneurial confidence. In the process of group activities, a clear division of labor should be carried out to see the direction of their own development, to unite and help each other in practical activities, and to lay a firm foundation for the future of computer professional innovation and entrepreneurship.

As for computer majored students, the colleges should create a more diverse space for innovation and entrepreneurship education and enable more innovative students to apply practical ability of entrepreneurship and realize their innovative ideas.

Organizing and leading students to participate in various competitions, this will constantly adjust them entrepreneurial teams and innovative entrepreneurial content.

V. CONCLUSION

This paper analyzes the problems existing in the cultivation of entrepreneurship and innovative education for computer professional and puts forward relevant coping strategies. As far as the cultivation of computer-based innovative entrepreneurial talents is concerned, the implementation of this model training program is very effective to a certain extent, especially in the guidance of students' ideas of innovation and entrepreneurship. Despite the certain shortcomings of the above-mentioned strategies, due to the importance of 'Entrepreneurship and innovation' talents, it is necessary to intensify the training of talents in

this aspect. During the promotion period, according to the actual situation, the strategies can be modified to achieve better training results.

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