Exploration of Innovation and Entrepreneurship Education and Practice Reform in Surveying and Mapping Major

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Abstract: Deepening the reform of university innovation and entrepreneurship education is a breakthrough in promoting the comprehensive reform of higher education, and an important guarantee for comprehensively improving the quality of talent training and enhancing students' innovation and entrepreneurship ability. The cultivation of innovative and entrepreneurial ability in surveying and mapping is not only conforming to the transformation of China's higher education from extension to connotation development, but also of great significance to the diversification of surveying and mapping engineering training, the implementation of quality education and the improvement of personnel training quality. This paper elaborates on the importance of innovation and entrepreneurship practice teaching in surveying and mapping majors, the construction and realization of innovation and entrepreneurship practice teaching mechanism in surveying and mapping majors, as well as the reform effectiveness and demonstration effect, in light of the problems existing in the practice teaching of innovation and entrepreneurship education for undergraduates in surveying and mapping majors.

Keywords: Innovation and entrepreneurship, Practical teaching, Teaching reform, Teaching mechanism.

1. Introduction
In 2012, the 18th CPC National Congress proposed "implementing innovation-driven development strategy"; in 2017, the 19th CPC National Congress proposed "accelerating the construction of an innovative country and strengthening the construction of a national innovation system". The implementation of this series of development strategies requires a large number of innovative and entrepreneurial talents, and the cultivation of innovative and entrepreneurial talents cannot be
achieved without innovation and entrepreneurship education in universities, especially in science and engineering universities. Colleges and universities, especially science and engineering colleges and universities, are social organizations that cultivate high-quality talents for national economic construction, and contemporary college students, especially science and engineering students, are full of imagination and creativity, and are the new force of "mass entrepreneurship and innovation". Science and engineering colleges and universities actively carry out innovation and entrepreneurship education, and should strengthen the cultivation of innovation spirit, entrepreneurial consciousness and innovation and entrepreneurship ability of science and engineering students. Since the expansion of university enrollment in 1999, the rapid development of higher education in China and the expansion of university enrollment have led to an increase in the number of graduates year by year. 2017 is expected to reach 7.95 million university graduates, the employment situation is increasingly severe, "graduation is unemployment" is not uncommon. The development of innovation and entrepreneurship education in science and engineering colleges is directly related to the cultivation of innovation spirit, entrepreneurial consciousness and innovation and entrepreneurship ability of science and engineering college students, and directly related to the employment competitiveness and entrepreneurship success rate of science and engineering college students. Only by constantly improving the innovation spirit, entrepreneurial consciousness and innovation and entrepreneurial ability of S&E students can we cultivate innovative and entrepreneurial talents who can adapt to the needs of society and the development of the times, and achieve higher quality employment and entrepreneurship.

In order to implement the State Council's national strategy of "mass entrepreneurship and innovation, promote the high-quality development of innovation and entrepreneurship, and create an upgraded version of double-entrepreneurship", and further enhance the innovation and entrepreneurship ability of college students.

2. The Importance of Innovation and Entrepreneurship Practice Teaching in Surveying and Mapping Major

2.1 From the mastery of theoretical knowledge to practical ability must be through practical teaching

The main way for college students of surveying and mapping majors to participate in practical activities is practical teaching, which can deepen their understanding of theoretical knowledge and accumulate practical experience and exercise their practical ability. Students' ability of independent thinking and innovation can be cultivated and exercised in the process of continuous practical teaching to find and solve problems. Therefore, practical teaching is the only way from theoretical knowledge to practical
ability.

2.2 Improve students’ interest in learning through practical teaching
The practical teaching of surveying and mapping majors can be carried out in various ways, such as social practice, simulation experiments, and entrepreneurial project exercises. Students can discover new problems, relate the theoretical knowledge they have learned to practical problems, thus they can deeply appreciate the use and meaning of knowledge, gain a sense of achievement, and have the motivation to further study and research. Only through practical teaching can students find out, analyze and solve problems, therefore, practical teaching is necessary to improve students' interest in learning.

2.3 Cultivating students' innovation and entrepreneurship ability must be achieved through practical teaching
Among the three kinds of abilities such as practical ability, innovation ability and entrepreneurial ability, practical ability is the most basic, and it is possible to have innovation ability only when you have practical ability, while entrepreneurial ability can only be acquired on the basis of having innovation ability. Therefore, the cultivation of innovation and entrepreneurship ability is a kind of comprehensive and systematic process, and the innovation and entrepreneurship ability is a kind of comprehensive ability, which must be cultivated through practical teaching.

2.4 Promoting the all-round development of college students must be done through practical teaching
Innovation and entrepreneurship require students to have a comprehensive ability to develop all-roundedly after graduation, such as the ability to think independently, hands-on ability, communication ability, analytical ability, team spirit, anti-frustration ability, etc. This comprehensive ability needs to be accumulated and formed gradually in practice. Such comprehensive abilities need to be gradually accumulated and formed in practice. Practical teaching provides such an opportunity for students to practice and improve their abilities, thus promoting their all-round development and enabling them to think positively and respond flexibly to future difficulties and setbacks.

3. Problems of innovative and entrepreneurial practice teaching in surveying and mapping

3.1 Insufficient ideological understanding
Emphasis on theory rather than practice has always been a shortcoming in the teaching process, and practical teaching activities have not been given much attention. For example, the number of teaching hours is small, the lack of independent practical teaching system, and the disconnection between teaching links and production activities, etc. These problems make the current talent training model unable to meet
the requirements of cultivating students' innovation and entrepreneurship. As a result of these problems, the current talent cultivation model can no longer meet the requirements of cultivating students' innovation and entrepreneurship. Therefore, the importance of practical teaching should be fully recognized and valued by the universities.

3.2 Lack of Teaching Mechanism

3.2.1. The teaching system needs to be improved
The importance of innovation and entrepreneurship has not been fully recognized by leaders, and the objectives of innovation and entrepreneurship practice teaching have not been clearly defined. The practical teaching of innovation and entrepreneurship in surveying and mapping majors generally has the problems of incomplete system, formality, arbitrariness and lack of sustainability. This makes it difficult to cultivate students' innovation and entrepreneurship ability and to realize their employment and entrepreneurship goals.

3.2.2. Failure to integrate with professional education
The courses related to innovation and entrepreneurship are not well designed with professional knowledge, not well integrated with students' professional education, and only focus on the specific skills of innovation and entrepreneurship, neglecting the cultivation of students' innovation spirit and consciousness, and students' innovative and entrepreneurial thinking is not well developed.

3.2.3. Emphasis on knowledge and skills rather than ability
Knowledge transfer and skills training play an important role in the current practical teaching of innovation and entrepreneurship, through which students can acquire relevant theoretical knowledge and operational skills, but fail to cultivate creativity, which is the essence of innovation and entrepreneurship.

3.3 Limited participation
The low level of participation is reflected in two aspects: First, the audience for practical education on innovation and entrepreneurship is very limited. Only those students who are interested in starting their own business, or are in the process of starting their own business, participate in the practical teaching activities of innovation and entrepreneurship. Secondly, the practical activities are mainly in the form of virtual business rather than actual business. Computer simulations or entrepreneurship competitions are the main components of practical entrepreneurship education.

3.4 Lack of Teaching Resources
There are two common forms of organization for practical teaching of innovation and entrepreneurship: one is in the form of courses, which often suffers from lack of funding or insufficient teachers. The other is in the form of competitions, such as "Career Planning" and "Entrepreneurship Competition". This form is usually just a
formality, and students' innovative and entrepreneurial abilities are not greatly improved after participating in it, so it cannot play a real role in cultivating students.

3.5 Weak faculty
There are two main reasons for teachers' lack of innovation and creativity: Firstly, teachers' advantages are reflected in their high theoretical level and research ability, which do not meet the demand for practical teaching of innovation and entrepreneurship, thus affecting the cultivation of students' innovation and entrepreneurship ability. The second is that teachers have heavy teaching and research tasks, are part-time in the teaching of innovation and entrepreneurship, not enough energy, and the guidance they give to students can not keep up with the development of the times and social changes, so they can not reach the established teaching goals.

4. Construction and realization of innovation and entrepreneurship practice teaching mechanism for surveying and mapping majors - Taking "Cloud Creation Space" Innovation and Entrepreneurship Practice Education Center of Nanjing University of Information Engineering as an example

4.1 The construction of practical teaching mechanism for innovation and entrepreneurship
4.1.1. Building Ideas
In the process of building the innovation and entrepreneurship practice teaching system for surveying and mapping majors, we should highlight the cultivation of innovation and entrepreneurship ability, pay attention to the combination with professional characteristics, and increase the proportion of professional practice teaching.

a) Highlight the cultivation of innovative and entrepreneurial ability
The cultivation of innovative and entrepreneurial ability of surveying and mapping students is a systematic project, which requires a step-by-step process: building innovative and entrepreneurial consciousness - accumulating innovative and entrepreneurial knowledge - practicing innovative and entrepreneurial ability.

b) Focus on combining with professional characteristics
The cultivation of innovative and entrepreneurial ability of surveying and mapping majors cannot be achieved without professional foundation, which is determined by the law of higher education and market demand, so that students can apply the theoretical knowledge of majors to the practice of innovation and entrepreneurship.

c) Increase the proportion of practical teaching of majors
The practical teaching sessions of surveying and mapping majors can be divided into
two categories, one is relatively independent curriculum practice, and the other is integrated practice that integrates professional content with innovation and entrepreneurship. The cultivation of innovation and entrepreneurship needs to increase the proportion of integrated practice to improve students' analytical and problem-solving abilities.

4.1.2. Guaranteed by a complete support system
A comprehensive and strong support system is the guarantee for the smooth implementation of the innovation and entrepreneurship practice teaching system. It mainly includes conceptual support, teacher support and institutional support.

a) Conceptual Support
Awareness determines action. Awareness of innovation and entrepreneurship education also directly affects the practice of innovation and entrepreneurship among administrators, teachers and students. Therefore, colleges and universities should firstly raise the awareness of managers and teachers, and strengthen the propaganda through various channels to establish the correct concept of innovation and entrepreneurship among students. This is the prerequisite and foundation for successful management and effective participation in innovation and entrepreneurship education.

b) Faculty Support
In order to alleviate the shortage of practicing innovation and entrepreneurship teachers, it is necessary to create a strong practicing faculty. Two measures can be taken at the same time: The first is to integrate the existing innovation and entrepreneurship practice faculty on campus according to teachers' majors. The second is to strengthen the cooperation with enterprises, and take various ways to hire external experts to participate in practice teaching.

c) Mechanism Support
In order to coordinate and smoothly implement the various links in the process of entrepreneurship practice teaching, it is necessary to establish a sound mechanism for innovation and entrepreneurship education. The first is the incentive mechanism, which can mobilize the enthusiasm of teachers and students as well as the relevant personnel of enterprises involved in the practical teaching, and create a good atmosphere for all kinds of personnel to actively participate. The second is the constraint mechanism, which can be timely supervised and reasonably evaluated, and the deficiencies and loopholes can be compensated and improved in time. Third, a guarantee mechanism, including physical guarantee (equipment, software, laboratories, conference halls, activity centers and other hardware and software and places) and financial guarantee (financial support for various competitions, projects, training, etc.).
4.2 The realization of practical teaching mechanism of innovation and entrepreneurship in universities

In recent years, Nanjing University of Information Science and Technology has cooperated with China Meteorological Administration, State Oceanic Administration, Nanjing Jiangbei New District Administrative Committee and other units to build and share, relying on the advantageous resource platform, to gather, integrate and optimize resources, to realize teaching, research and practice, and promote the three-in-one, and build the university-level "Cloud Creation Space" innovation and entrepreneurship education center.

4.2.1. Continuously updating the concept of innovation and entrepreneurship education

Adhering to the concept of "open development, collaborative development and characteristic development", we actively explore ways of institutional mechanism innovation, vigorously promote the co-construction and cooperation among industries, schools, universities, inter-schools, school enterprises and schools and localities, make full use of the advantages of all parties, carry out in-depth integration of science and education, integration of production, learning and research, and promote innovation and entrepreneurship talent training; connect with the industrial chain, optimize the innovation and entrepreneurship talent training model, and appropriately adjust the curriculum and education mode.

4.2.2. Accelerate the construction of innovation and entrepreneurship education system

Revise the talent cultivation program, increase the curriculum and credits of the dual-creation courses; hire part-time teachers and industry professors to teach the courses; invite them to set up teaching teams with current teachers to jointly build high-quality courses on innovation and entrepreneurship and compile several teaching materials; and build a modular innovation and entrepreneurship course system by means of stratification and classification.

a) Double-entrepreneurship Education System and Management Mechanism

By reforming the curriculum, mentor team, platform construction, rules and regulations, we build a three-dimensional innovation and entrepreneurship education system that combines "point, line and surface", with academic competitions as the driving force and double-creation activities as the support. With collaborative construction as the mechanism, "point, line and surface" is combined to build a "1+1+N" innovation and entrepreneurship practice platform open to all teachers and students, i.e. 1 cloud creation space + 1 cloud creation space. Entrepreneurship Park + N dual-entrepreneurship studios. The platform is led and managed by the Academic Affairs Department, with the leader in charge of innovation and entrepreneurship as
the person in charge of the platform on campus and three full-time staff members to manage the daily affairs of the platform. The university Youth League Committee, academic workers, colleges and other units will coordinate the platform.

b) Organic integration with professional education
The university pays attention to the organic integration of innovation and entrepreneurship education and professional education, according to the "modular" construction ideas, building a dual-creation curriculum system with general education, embedded professional classes, professional classes and vocational classes as the main categories.

4.2.3. Establish incentive policies for innovation and entrepreneurship education
The university constantly improves the management system of dual-creation, stimulates the enthusiasm of teachers and students to participate in dual-creation activities, and promotes the orderly, standardized and efficient development of dual-creation education. It is clearly stipulated that innovation and entrepreneurship are linked with the title evaluation and workload assessment, and the maximum cash award of 200,000 RMB is given to the team of instructors who guide students to win awards in academic competitions at the provincial level or above. The university will give cash awards of up to 200,000 RMB to the team of instructors who have won awards in academic competitions at the provincial level or above. The university has promulgated the Measures for the Management of Undergraduate Innovation and Entrepreneurship Credits, the Regulations for the Administration of Undergraduate Discipline Competitions, and other systems of credit transfer, financial support, award and merit evaluation, exemption from examinations and research, and suspension from school to maintain student registration, etc., to motivate students to participate in dual-creation.

4.2.4. Constructing a practical platform for government-school-enterprise linkage
a) Platform Construction
Based on the advantageous resources of "Joint Laboratory of International Cooperation on Climate and Environmental Change" and "Collaborative Innovation Center for Meteorological Disaster Forecasting, Early Warning and Assessment" of the Ministry of Education, our university was approved as a "Cloud Creation Space" for national records. "For many years, the university has been actively building and sharing innovation and entrepreneurship platforms through the strategy of "merging the vertical and horizontal". The university and Jiangbei New District jointly established the public creation space "Cloud Creation Space", and carried out joint construction in project incubation, site construction, teacher training, etc. The platform includes product incubation, business incubators, gas pedals, technology parks, angels and seed funds, providing free and open office space. The platform includes product
incubation, business incubation, gas pedal, science and technology park, angel and seed funds, providing free and open office space and business incubation services, and offering special activities such as business clubs, salons, mentors' diagnosis and consultation, and hacker training camps. The university led the formation of the "Jiangbei New District University Innovation and Entrepreneurship Alliance", and shared the platform, courses, and teacher resources with five universities, including the Nanjing University of Technology "Hacker Dream Factory".

b) Cooperation
The university has reached cooperation with the China Universities Innovation and Entrepreneurship Incubator Alliance, which provides intellectual support for innovation and entrepreneurship, promotes scientific and technological innovation, reduces the cost of entrepreneurship, increases the success rate of entrepreneurship, and provides landing support and platform service support for innovation and entrepreneurship; on the site, the university has reached cooperation with the Nanjing Zhongwang Satellite Communication Co.

4.2.5. Strengthen the construction of faculty
Relying on the integration of industry and education, we build a team of "government, enterprise, industry and university" collaborative education and dual-creative mentors, and implement the "Three Hundred" project, i.e. employing 100 government and industry experts as innovation and entrepreneurship mentors, and employing 100 enterprise elites and investors as mentors. We have hired 100 outstanding full-time teachers as innovation and entrepreneurship instructors. In addition, the university will continue to optimize the university's innovation and entrepreneurship education team, revise the selection and hiring plan for innovation and entrepreneurship instructors, raise the threshold and evaluation standards for innovation and entrepreneurship instructors, increase the remuneration for innovation and entrepreneurship instructors, and improve the overall quality of the faculty.

5. Reform Effect and Demonstration Effect
5.1. Significant achievements in dual creation
The university runs innovation and entrepreneurship education through the whole process of talent training, promotes the integration of innovation and entrepreneurship education with professional education and ideological education, and focuses on cultivating students' innovation consciousness, practical ability and struggle spirit. The university has been awarded the first batch of national model universities for deepening innovation and entrepreneurship education reform, national universities with typical experience in graduate employment, national advanced units for entrepreneurship education research and practice in higher education, and national
public creation spaces. In recent years, our students have won the gold medal of the Internet+ Student Innovation and Entrepreneurship Competition, the grand prize of the "Challenge Cup" national extracurricular academic science and technology work competition, the first prize of the national mathematical modeling competition and the "Higher Education Society Cup" award, and the grand prize of the American University Students' Association. The top prizes include the Grand Prize of Mathematical Modeling Competition, the Grand Prize of China Robotics Competition, the Champion of Algorithm Competition of International Computer Vision and Pattern Recognition Conference, the First Prize of China Smart Car Competition, the First Prize of National University Electronic Design Competition, the First Prize of National Youth Science and Technology Innovation Competition Final, and other major competitions.

5.2 High praise from leaders
In 2017, Wan Junbo won the title of "Top Ten Pioneers of Entrepreneurship", which was awarded by Huang Lixin, deputy secretary of Jiangsu Provincial Party Committee and executive vice governor of Jiangsu Province. In 2016, Mr. Li Orwei, Deputy Director General of the Department of Higher Education of the Ministry of Education, and Mr. Huang Wei, President of Nanjing University of Technology, fully affirmed our "Internet+" venture project. 2015, Mr. Ning Ziyao and Mr. Wang Ziyao, the gold medal winners of the First China "Internet+" Student Innovation and Entrepreneurship Competition, were awarded the "Internet+" venture project. Professor Min Jinzhong, the instructor, was received by Comrade Liu Yandong, Vice Premier of the State Council; Zhang Daliang, then Director General of the Department of Higher Education of the Ministry of Education, gave full affirmation to the gold medal of the "Internet+" Student Innovation and Entrepreneurship Competition and had an in-depth discussion with the winner Xu Kang; the then Mayor of Nanjing gave a warm welcome to our university. "The then vice governor of Jiangsu Province, Cao Satellite, and Wan Wenhua, secretary of the Jiangsu Provincial Youth League Committee, gave special instructions to our project during the "Internet+" Innovation and Entrepreneurship Competition.

5.3 Extensive media coverage
In the past three years, newspapers, TV, websites, WeChat and other media have reported more than 80 times on our university's innovation and entrepreneurship education work and its effectiveness, and gave it a high evaluation. Ning Ziao, an alumnus of the university, was selected by Forbes as one of the top 30 under 30 in 2018. The front page of Guangming Daily reported our school's advanced management work, and CCTV and Jiangsu TV reported and interviewed Mi Dewu, the international student from our school, and Ning Ziao, the gold medal winner of China "Internet+" Student Innovation and Entrepreneurship Competition. Many innovation
and entrepreneurship projects have been reported and reprinted by China Education Newspaper, Xinhua Daily and other IO print media, as well as Sina, Baidu, Sohu and other mainstream online media.

6. Conclusion

a) To clearly understand the deficiencies of the current innovation and entrepreneurship practice teaching mechanism in Chinese colleges and universities, and provide direction for the future reform. Although the practice teaching of innovation and entrepreneurship in Chinese universities has made great development, there are still many deficiencies, which seriously restrict the cultivation of innovation and entrepreneurship talents. The main problems of practice teaching are systematically analyzed by sorting out the current situation of practice teaching research, which provides a direction for the future reform of practice teaching in colleges and universities.

b) Establish a scientific innovation and entrepreneurship practice teaching mechanism to provide reference for cultivating innovation and entrepreneurship talents in colleges and universities. The construction of university innovation and entrepreneurship practice teaching mechanism is the core and key to cultivate innovation and entrepreneurship talents, and by establishing a university innovation and entrepreneurship practice teaching mechanism which includes both top-level design and guarantee mechanism with innovation and entrepreneurship practice teaching system as the core, it provides an important reference for cultivating innovation and entrepreneurship talents in universities.

c) Through systematic research on innovation and entrepreneurship practice teaching, it is of great significance to improve the innovation and entrepreneurship ability of college students and to solve the problem of employment difficulties of college students. In recent years, the solution of the employment problem of college students has attracted wide attention. The solution to the employment problem involves both the supply and demand of labor. It is of great significance for solving the employment problem of college students to start from the labor side to find out the causes, to cultivate college students' innovation and entrepreneurship consciousness and ability, to improve their comprehensive quality, and to make them adapt to the market demand and the requirements of the times through the perfection of innovation and entrepreneurship practice teaching.

On the basis of summarizing and learning from existing research results, this paper conducts an in-depth investigation and analysis of the current situation of innovation and entrepreneurship education for college students majoring in surveying and mapping at NUIST, which has certain theoretical significance for further promoting the
theoretical research on innovation and entrepreneurship education in colleges and universities and improving the theoretical system and content of innovation and entrepreneurship education in science and engineering colleges and universities. At the same time, this paper investigates and studies the current situation of innovation and entrepreneurship education in colleges and universities, analyzes the influencing factors of innovation and entrepreneurship education in colleges and universities, and puts forward optimized ways and measures to provide theoretical guidance and decision-making reference for the innovation and entrepreneurship education in colleges and universities.

References


