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Dasong Sun, Shuqing Li & Xia Xu

Entrepreneurship Education

ISSN 2520-8144
Volume 3
Number 1

Entrep Educ (2020) 3:77-93
DOI 10.1007/s41959-020-00024-6

Springer

Entrepreneurship Education (2020) 3:77–93
https://doi.org/10.1007/s41959-020-00024-6

ORIGINAL PAPER

Analysis of reform and development strategies of China's Internet innovation and entrepreneurship education

Dasong Sun[1] · **Shuqing Li**[2] · **Xia Xu**[3]

Received: 12 January 2020 / Revised: 6 February 2020 / Accepted: 7 February 2020 /
Published online: 24 February 2020

Abstract

Innovation and entrepreneurship education is one of the hot areas of higher education research and practice in China in recent years. Internet innovation and entrepreneurship can be taken as a new direction which can also provide a new development opportunity and change path for the theoretical research and application practice of contemporary innovation and entrepreneurship education in China. Based on the analysis of the concepts, characteristics and development status of Internet innovation and entrepreneurship education in China, this paper focuses on the implementation strategies of Internet innovation and entrepreneurship education, including the basic contents of curriculum setting, teaching method reform, teacher team building, Internet innovation and entrepreneurship practice. Finally, the paper further discusses how to improve the problems involved in Internet innovation and entrepreneurship education in China.

Keywords Internet · Innovation and entrepreneurship · Higher education · Reform in education · China

✉ Shuqing Li
leeshuqing@gmail.com

Dasong Sun
nuistsun@126.com

Xia Xu
msxu77@163.com

[1] Office of Educational Administration, Nanjing University of Finance and Economics, Nanjing 210023, China

[2] Department of Information Management and Information System, College of Information Engineering, Nanjing University of Finance and Economics, Nanjing 210023, China

[3] Department of Business Administration, School of Management, Nanjing University of Posts and Telecommunications, Nanjing 210023, China

Introduction

In essence, any behavior that can alter the productive potential of existing resource by recombining the elements of resource can be seen as an innovation (Drucker 2014). For enterprises and individuals, breakthrough of innovation usually gains a strong monopoly position, and thus can achieve more market value. For countries, innovation plays a fundamental role in the enhancement of national strength, and innovative goods and services are also the key to gain competitive advantage in the international market. Therefore, the team of innovative talents has become an important strategic resource to which countries all over the world attach great importance in this new era.

Conceptually, innovative education belongs to the category of quality education, which mainly refers to the development of students' creative consciousness, innovative thinking, innovative ability and innovative personality according to the principles and methods of innovation, and to guide students to use it in their own study and work (Zhu and Yang 1999). It contains three dimensions: innovative knowledge, innovative ability and innovative thinking. Each dimension puts forward different training requirements for students. Knowledge is the foundation, ability is the key, and thinking is the soul. Specifically, innovative knowledge requires students to understand the general process and method of innovation behavior, and to utilize the practical application value of innovation in various application fields in theory. Innovative ability is reflected in the practical ability of students which can enhance the ability to grasp opportunities with combining the innovation knowledge and professional skills. Innovative thinking has a higher-level function and focuses on cultivating students' ability to form various thinking training abilities, including problem-oriented thinking, critical thinking and creative thinking.

Entrepreneurship education mainly refers to the relevant educational theories and methods aimed at improving and strengthening the students' basic quality and ability of entrepreneurship. Compared with the innovation education, it puts forward higher goal requirements and integrates many unique content of entrepreneurship practices such as team building and financing. In terms of knowledge system, in addition to the necessary professional knowledge and abilities, entrepreneurship education requires students to master the necessary knowledge of economic management in order to facilitate the development of business planning, market analysis and entrepreneurial management. In terms of ability, entrepreneurship education also requires students to have a better ability of teamwork, a strong level of compression and a strong sense of competition. In terms of thinking, students are required to be more flexible in adapting to the requirements of reality, to actively develop the good will of active thinking and lifelong learning, to turn these into self-efficacy in the end, and to achieve the success of team entrepreneurship through strong leadership. These are the key to becoming innovative entrepreneurial talent.

In essence, innovation and entrepreneurship are inextricably linked. Although innovation often takes scientific and technological innovation as its core and

starting point, the ultimate value of innovation should still be reflected on entrepreneurship and industrialization. At the present stage of highly competitive community economy development, for entrepreneurship, the meaning of business start-up process has also been gradually replaced by the meaning of commercial activity that can provide innovative products and services (Wikipedia 2019). The specific forms include the start-up of company, high-growth entrepreneurship, Gazelle business and so on, of which the entrepreneurship subject are mainly small and medium-sized technology enterprises with innovation characteristics and supported by innovation activities.

In fact the combination of innovation and entrepreneurship has also provided a new direction for economic development and reform in the new period, created a good social and cultural atmosphere that advocates innovation, promoted the willingness of individuals to innovate, and created a large number of new hatching modes such as creative space, entrepreneurship coffee and innovation workshop. These low-cost, convenient, functionally integrated and open support projects of innovation industry can reduce the threshold of innovation and entrepreneurship for more people, and help find more opportunities for innovation. From the performance of view, the rapid development of these small- and medium-sized enterprises can provide a continuous flow of impetus for the rapid improvement of China's innovation capacity at the macro-level, and the combination of innovation and entrepreneurship can also effectively alleviate the severe situation of overall employment in China at the micro-level. Some scholars' surveys show that 2 million newly registered enterprises in the first half of 2015, an increase of 19.4% over the same period last year, 7.18 million new jobs have been created, and more than 70% of the new jobs have been completed, all of which benefit from the Policy of Mass Entrepreneurship and Mass Innovation in China (Cai 2016).

Of course, innovation does not necessarily mean starting a business and innovative thinking is of great practical value in every field such as scientific research, work and all aspects of our lives. It is a key component of problem-solving and critical thinking so that many people such as entrepreneurs, politicians and educators believe that today's students need to have this innovation-based literacy in order to succeed in their own fields (Griffin and Care 2014). As Yang Bin (vice president of Tsinghua University) said, the goal of entrepreneurship education is to focus on cultivating innovative people which means cultivating students' pioneering spirit, adventurous spirit, independent consciousness, ability to challenge the status quo and creatively solve problems and meet social requirement (Yang 2015). This view has a long history. The Tokyo Conference in Japan, convened in 1991 by UNESCO Asia–Pacific Regional Office, distinguished between the narrow sense and the broad sense of entrepreneurship education, and argued that entrepreneurship education in the broad sense mainly refers to the development of pioneering individuals and lays the foundation for students' flexible, continuous and lifelong learning (Han and Ouyang 2007). These two levels of entrepreneurship education can be understood as the differences between professional education and qualitative education. Since 2016, countries all over the world have begun to incorporate innovation and entrepreneurship into the core quality of talent development in the new era. For example, the Ministry of Education of China announced the plan of Core Competencies

and Values for Chinese Students' Development in 2016 (Liu et al. 2016). Meantime, innovation and entrepreneurship education does not necessarily mean that innovation and entrepreneurship need to be carried out immediately after learning. The core of innovation and entrepreneurship education should be to teach students the consciousness and necessary ability of innovation and entrepreneurship, and to plant the seeds of hope. Students can naturally take this feasibility into account when the time is right and are more likely to put it into action in the future work (Sun 2010). It has led to a consensus that the key point of innovation entrepreneurship education lies in imparting students' entrepreneurial knowledge, cultivating students' creative spirit, setting up students' entrepreneurial consciousness and promoting their entrepreneurial ability. Therefore, the traditional point of view of promoting employment through entrepreneurship education needs to be further diluted in order to implement the popularization and promotion of innovation entrepreneurship education better. Only by driving development through innovation and entrepreneurship, transforming and upgrading entrepreneur into talents driving economic and social development, making innovative thinking and ability become the basic quality ability of talents from all walks, can students and the society understand and finally benefit from the meaning and essence of innovation and entrepreneurship more conveniently.

Innovation entrepreneurship education in China

Proposal of plans

The research on innovation entrepreneurship education has been started since 1980s in China, and it has a history of nearly 40 years. The rise of this research mainly comes from the concern and analysis of the alienation of the traditional educational model, and this research also conforms to the realistic requirement of the development of the market economy since the reform and opening-up in China (Zhang 2001). The earliest practice of Chinese colleges and universities was that Shanghai Jiao Tong University began offering elective courses of creativity study to undergraduate students in 1980, and some iconic events soon followed which indicates innovation entrepreneurship education in China has really entered the stage of rapid development. For example, the Ministry of Education in China confirmed Tsinghua University, Renmin University of China and other nine colleges and universities as innovation entrepreneurship education pilot in 2002. At this time, it began to be widely accepted that innovation entrepreneurship education is the core of higher education. The formal concept of Innovation Entrepreneurship Education was also put forward (Li et al. 2002), and was strongly advocated in the Plan of Promoting Innovation and Entrepreneurship Education in Universities & College Students' Independent Entrepreneurship Work issued by the Chinese Ministry of Education in 2010 (Cheng 2017). Since 2012, the continuous various national policies were issued by the Chinese Ministry of Education, such as the Plan on Improving the Quality of Higher Education (2012), the Plan on Improving Comprehensive Education Reform (2013). In 2015, the State Council of China also promulgated some important policies such as the Plan on Improving Comprehensive Reform of

Innovation and Entrepreneurship Education in Universities. Today, innovation entrepreneurship education has become one of the basic contents of Chinese colleges and universities education (Bai 2016).

Compared to the traditional innovation education in the past, innovation entrepreneurship education pays more attention to educational practices and activities. The achievement of innovation entrepreneurship education should be embodied by creating the comprehensive value of economic value and social value, and can also point out a new direction for the cultivation of innovative talents in the new period. To meet the practical requirements of the development of digital economy, the Government Report of China in 2015 proposed the policy of Mass Innovation and Mass Entrepreneurship for the first time. Especially in the current period of 13th Five-year Plan, the Chinese government strongly advocated the Internet, big data and artificial intelligence and other advanced information technology to transform the traditional real industry economy. All these beneficial policies have finally promoted the continuous development of innovation and entrepreneurship education in China.

Analysis of development

There are many new features in the development of innovation entrepreneurship education in China:

(1) The form of innovation and entrepreneurship education is increasing. The potential products, the spirit of innovation and the attitude of openness and sharing brought by innovation entrepreneurship education can make up for the critical part of the development of higher education in China (Huang et al. 2015). This concept of Two-ability Talent has finally become the focus of common concern of the society, which two abilities mean innovation and entrepreneurship. Specific training models include degree training mode, curriculum certificate model, activity training mode relying on employment and league committee, incubating mode based on science and technology park (Fan 2016).

(2) The impetus of policy to encourage college students' innovation and entrepreneurship is increasing. A number of preferential policies and support mechanisms for college students' innovation and entrepreneurship are constantly issued by the government, which main objective is to strengthen the guidance and service of innovation and entrepreneurship, promulgate preferential tax policy and improve venture capital mechanism, and guide graduates to actively start a business. In fact, Chinese government has been playing an important role in promoting education in innovation entrepreneurship. The Global Entrepreneurship Report published by the Global Entrepreneurship Monitor of the United States in 2016 ranked China the third place in 62 monitoring countries in the ranking of the impact of government policies on entrepreneurship (Zeng et al. 2012).

(3) Colleges and universities should become the main executor of innovation entrepreneurship education. In May 2015, the State Council of China promulgated the Plan on Improving Comprehensive Reform of Innovation and Entrepreneurship Education in Universities, and higher education has gradually become an impor-

tant role for cultivating innovative and entrepreneurial talents in China. This not only shows that a wide range of courses related to innovation entrepreneurship education have been offered in various professional talents training programs in many colleges and universities since 2016, but also shows that some colleges and universities also set up professional organizations such as innovation and entrepreneurship colleges and entrepreneurship education centers which carried out the design of innovation and entrepreneurship education system and the implementation of talents training plan. The Ministry of Education of China issued the Announcement on the Employment and Entrepreneurship of the Graduates of the 2016 Chinese Colleges and Universities in December 2015, which emphasized once again that colleges and universities are the training bases for innovative entrepreneurial talents, higher education is the cornerstone of cultivating innovative entrepreneurial talents, and the cultivation of innovative and entrepreneurial talents depends to a large extent on the quality of innovation entrepreneurship education in colleges and universities. The announcement also clearly required that all Chinese colleges and universities should offer compulsory courses and elective courses in innovation entrepreneurship education, as well as entrepreneurial guidance and practical training courses from 2016 (Liu et al. 2016a, b). Meanwhile, a large number of innovation entrepreneurship curriculum textbooks and online courses have emerged one after another, which greatly enriches the teaching resources of the existing innovation entrepreneurship education (Xue et al. 2016). In September 2017, the Announcement on Strengthening the Reform of Educational System and Mechanism issued by the State Council of China pointed out that innovation and entrepreneurship education should be embodied through the whole process of student training, a dynamic adjustment mechanism for disciplines and specialties should be established, the corresponding curriculum system should be improved, the construction of teaching materials and training bases should be strengthened, the credit system and flexible learning system should be perfected, and teachers should be encouraged to innovate existing teaching methods.

The proposal of Internet innovation and entrepreneurship education

Internet innovation and entrepreneurship

The combination of the Internet and innovation entrepreneurship is not an accident, and there has always been a closer relationship between them. In fact, the Internet itself is the product of innovation and entrepreneurship brought about by information technology after the 1980s. At the same time, the development of the Internet has resulted in more acceptance of openness and sharing, real time and other ideas which further create more favorable conditions for Internet-based resource integration and collaborative innovation, and create conditions for larger scope and deeper level of innovation and entrepreneurial behavior. Today, the rapid development and easier access to the Internet platform and new information technology can help

innovative entrepreneurs get more unprecedented convenience. Internet thinking has brought them a broader vision and broadens the angle of thinking.

In China, the combination of Internet and Innovation and Entrepreneurship Education started in 2015, when the Report on the Work of Chinese Government first proposed the action plan of Internet+. The plan emphasizes the full use of the contemporary Internet of things, cloud computing, big data, artificial intelligence and other emerging information technology, in order to explore the deep integration of Internet technology and traditional real economy, to realize the new development of innovation and entrepreneurship. It includes making full use of the emerging Internet information technology to reform and improve the production efficiency of traditional industries, and exploring new opportunities for industrial development and new industrial economic growth points. It can be believed that the Internet+ is the new state of the Internet development under the innovation environment, and the innovation can give full play to the value connotation of the plus (Kang and Zhang 2016).

In the era of big data, the rapid growing and widely shared data resource has gradually become a favorable tool for innovation and entrepreneurship of the Internet. The Guidance on Actively Advancing the Internet+ Initiative issued by the State Council of China in 2015 further encouraged large Internet enterprises to open platform portal, data resource and corresponding computing capability to small- and medium-sized innovative enterprises, to help small- and micro-enterprises foster business models with more innovative development potential better. For example, Baidu began to provide Baidu Cloud Engine service and E-commerce Cloud service is also provided by Alibaba. The construction of Big Data sharing platform of public government data resource is also in rapid implementation. By the second quarter of 2016, the number of registered users on Tencent's open platform had reached 6 million, with a total increase of 1.5 million users in 2 years, of which the ratio of individuals to companies was 7:3. All of these directly led to 1.05 million individual employment and entrepreneurship (Woshipm 2016).

Conceptually, the Internet innovation and entrepreneurship method is based on the Internet platform, use information and communication technology and cross-border integration of various industries to promote industrial transformation and upgrading, and can create new products, new businesses and new models through the action of innovation and entrepreneurship (Ma 2016). The typical application fields include modern agriculture, industrial Internet, Internet finance, energy Internet and so on, which are existing innovative industrial models derived from Internet information technology.

The Influence of Internet on the process of innovation and entrepreneurship

The Internet has provided new opportunities for the development of innovative and entrepreneurial activities, mainly in the following areas:

(1) The development of the Internet has given birth to a large number of new economic form, including Internet-related industries converting from traditional

industries, and the integration of online and offline after Internet enterprises come to the ground. For example, in the retail industry, the construction and utilization of the Internet user interest can achieve a multi-variety, small batch-personalized sales model for each user, changing the traditional model based on the production and sale of large-scale homogeneous products, which fully shows the economic value of the long tail effect. The same is true in the manufacturing industry, where customized production directly for consumers based on the Internet can achieve a more flexible way of personalized production at a lower price (Jiang 2015).

(2) The connection of everything by the Internet has generated a large number of data resource that can be used and shared, such as user behavior data, which has greatly changed the development model of enterprise production from production-centered to user-centered. The generation, collection, storage, processing and presentation of these data resource have made a lot of breakthrough results, which have brought about obvious zero marginal cost effect. Compared with the physical manufacturing industry, which has higher entry threshold and technical complexity, the consumption field is also the industry with higher degree of marketization, more social idle resources and the most obvious problem of information asymmetry. Therefore, retail industries like e-commerce are the earliest to achieve a profound revolution on the Internet. With the continuing enhancement of understanding user behavior by retail industry, wholesale, manufacturing and raw material supply of upstream industries, which are triggered by the interconnection of the retail industry on the Internet, not only can the waste of total social resources be greatly reduced in the end,but also it can better meet the requirement of user and provide more personalized service.

The influence of Internet on innovation and entrepreneurship education

With the help of Internet innovation and entrepreneurship, it can provide new ideas and directions for the development of innovation and entrepreneurship education in colleges and universities.

(1) It is easier for innovation and entrepreneurship education to be popularized. Compared with the traditional educational forms of innovation and entrepreneurship based on professional integration, Internet innovation and entrepreneurship is easier to be widely understood and familiar to more students, and the ubiquitous Internet innovation in daily life can also arouse them to think more possibilities. Therefore, Internet innovation can break through the ideological barriers for the current education of innovation and entrepreneurship, which believe that innovation and entrepreneurship is only the establishment of enterprises and the cultivation of traditional connotations such as bosses. It will promote people to regard innovation and entrepreneurship as an important quality closely related to daily work and learning. This idea will match the national proposal of Mass Innovation and Mass Entrepreneurship, and ultimately provide the basis for the extensive development of the general knowledge system of entrepreneurship

education for all students. It can also provide possibility for the integration and development of quality education and professional education and the construction of a broad spectrum education system.

(2) It provides a new opportunity for the combination of professional knowledge innovation and enterprise application. In order to get a fundamental change in the traditional education mode, we must step out of the primary stage of the superficial reform, that is, to break through the process of personnel training led only by universities. Through innovation and entrepreneurship education, students can get more resource input and education training from many aspects, such as enterprise, society and government. It is more convenient to form the concept of Big Entrepreneurship Education which combines in-class and extra-curricular education and integrates educational practice (Wang 2015).

(3) The opportunity for innovation is easier for students to understand and taken. Most of Internet innovation and entrepreneurship have the no requirement of heavy assets, and many projects can be implemented without large initial investment. Therefore, the capital threshold, such as initial equipment acquisition and fixed asset investment, has been lowered. From the three-element model of Timmons entrepreneurship model, it can be seen that the Internet has brought about the possibility for students to utilize the opportunities, team and resource of entrepreneurship (Timmons 1977). In fact, the Internet-based open innovation and public entrepreneurship have become the mainstream model of contemporary innovation and entrepreneurship (Chen et al. 2016). At the same time, a large number of Web information resource, such as learning resource, technical resource and shared resource, provide a very rich reference to entrepreneurs, and the widespread social networking also provides the possibility for communication and collaboration between different teams (Wan and Kang 2016). For example, through the online platform of hardware sale to obtain open-source modules and components, with contacting professional small volume manufacturers for rapid manufacturing of products and relying on a number of e-commerce platforms for pre-sale and bulk sales of products, a new entrepreneurship model of fast moving consumer goods (FMCG) based on distributed manufacturing and small batch products has been formed (Hu et al. 2016).

Implementation strategy of Internet innovation and entrepreneurship education

The complete Internet innovation entrepreneurship education system includes curriculum setting, teaching method reform, teaching staff construction, innovation entrepreneurship practice and other basic contents. The following are explained separately.

The setting of curriculum

The content of the Internet innovation entrepreneurship curriculum can be considered in accordance with the entrepreneurial process, and combine Internet platform, Internet innovation project, Internet entrepreneurship, entrepreneur and

entrepreneurship team, Internet entrepreneurship opportunity, Internet business model design, Internet entrepreneurship program, integration of Internet entrepreneurship financing and Internet enterprise management into curriculum system. Meanwhile, due to the high-risk characteristics of Internet entrepreneurial behavior itself, curriculum content also needs to strengthen the comprehensive cultivation of students' psychological quality, stimulates students to pay attention to maintain physical and mental health, and builds up students' confidence in resisting setbacks and develop the quality of perseverance (Gu 2015).

With regard to the combination of Internet innovation entrepreneurship education and professional education, some scholars believe that the development of innovation entrepreneurship education in colleges and universities must be combined with professional education, and pay attention to develop students' quality of innovation and entrepreneurship in reforming professional education (Hong 2016). Other scholars believe that the innovation and entrepreneurship education not based on the learning major disciplines cannot give full play to the students' professional advantages (Huang et al. 2017), meanwhile it is easy to make students mistakenly think that only entrepreneurship and competition are the main purpose, while neglecting the essence of innovation and entrepreneurship (Zhang et al. 2018). There are two specific implementation strategies:

(1) We should strengthen the reform of personnel training with the emphasis on research and practical teaching in the existing professional education in all universities, and make full use of Internet information technology and application. It can make students realize their understanding of professional application and Internet innovation, and inspire the potential Internet entrepreneurial passion and will. Some majors such as medicine, art, business and even literature, can consider more in-depth integration of this professional curriculum and Internet innovation entrepreneurship, through the reform of curriculum system. This combination does not only mean the use of professional knowledge to transform and enhance the capacity of the existing Internet innovation entrepreneurship education, but also has a positive impact on the professional education itself. For example, it can help students to form a more effective way of learning, from the passive role of the traditional knowledge recipient to the active role of the knowledge applicator, so as to explore the learning problem in-depth on their own, and constantly generate new ideas to provide the foundation for the birth of possible innovative products and achievements (Zheng and Li 2014).
(2) It is necessary to independently offer some courses combining Internet innovation and entrepreneurship with professional knowledge education. Some universities can even consider the combination of students' interests, offer general Internet innovation and entrepreneurship courses and specialized Internet innovation and entrepreneurship courses, respectively, according to the strength of students' entrepreneurship intention. By combining the existing innovation and entrepreneurship courses with students' majors, more targeted and innovative entrepreneurship courses can be proposed from the perspective of students. It needs to encourage the extensive involvement of business majors in existing colleges and universities, as well as encourage other teachers of science and

engineering majors to explore the transformation and marketization of their scientific research products, the creation of Internet content for innovation and entrepreneurship, and the guidance services for students' projects. General Internet innovation and entrepreneurship courses pay more attention to the cultivation of innovative entrepreneurial thinking and consciousness, help students to understand the current situation of Internet innovation entrepreneurship industry, and stimulates students' relevant interest and thinking as the goal, while specialized Internet innovation and entrepreneurship courses mainly focus the effective guidance of specific Internet innovation and entrepreneurship activities, and aims to improve the students' ability to solve the problems of innovation and entrepreneurship so that it is often more professional and more practical (Table 1).

Reform of teaching methods

Generally speaking, the teaching process of Internet innovation and entrepreneurship should pay more attention to the case analysis, strengthen practical application while weakening the explanation of knowledge and the theory elaboration. The teaching of Internet innovation entrepreneurship course cannot adopt the traditional mode of classroom teaching. Therefore, more exploratory, heuristic and problem-based teaching methods are worth trying in order to guide students to learn actively, think actively and truly understand all aspects of the team's entrepreneurial process through the practical exercise of the project. Therefore, it is more important to interpret concepts differently, encourage independent research and thinking, and raise the students' question and debate through case teaching in the course teaching. The coursework should be challenging and it is the best to combine with the practical training such as the writing business plan or participate in Internet entrepreneurship competition, so as to stimulate the students' creative and entrepreneurial consciousness better, and to help students test their mastery of learning in practice (Council 2013). At the same time, it is also necessary to strengthen the combination of practice, to help interested students take the first step of starting a business through practical education like enterprise trainee, enterprise practice, innovation and entrepreneurship activities, other incubating platforms, entrepreneurship park and so on.

We can also find that there are higher requirements for the reform of teaching methods needed for Internet innovation and entrepreneurship. Some scholars think that the case-based teaching of the theory analysis is not a positive effect on entrepreneurship, but the teaching method of the case must focus on the self-consciousness decision making and the creative experiment (Gibb 1994). Similarly, practical teaching does not mean simple teaching activity like visiting practice, but it is to highlight students' participation, guide them to make conscious decisions and creative experiments in order to stimulate and cultivate students' entrepreneurial behavior.

In particular, experiential teaching is also an effective innovation and entrepreneurship education reform method. Experiential teaching is to create a certain situation in the teaching process, so that students can understand knowledge and develop ability in the process of personal experience and experience (Feng 2017).

Table 1 Curriculum content arrangement for Internet innovation and entrepreneurship curriculum for general, specialized and professional integration

	General Internet innovation and entrepreneurship curriculum	Specialized Internet innovation and entrepreneurship curriculum	Internet innovation and entrepreneurship with professional integration
Theoretical courses	Internet and Internet industry, entrepreneurship foundation, business management, innovative thinking	Entrepreneurial opportunity identification, entrepreneurial resources, professional innovation, industry analysis, entrepreneurial management, marketing management, laws and regulations	Case study, specialty innovation and application
Practical courses	Industry case analysis, industry analysis report, industry research practice	Business plan preparation, entrepreneurship consultation, entrepreneurship practice, Internet innovation and entrepreneurship competition	Professional practice experiment course, entrepreneurship practice, Internet innovation and entrepreneurship competition

This method emphasizes the interaction between teachers and students, as well as the interaction between students and society (Lao and Wu 2018). Specific forms can be taken such as entrepreneurial practice experiment, production practice and graduation project, as well as various social competitions (Zhan et al. 2019).

Construction of teaching staff

The shortage of innovation and entrepreneurship teachers has always been one of the main problems in Chinese education. The teaching staff in Chinese universities is mainly composed of scientific researcher and other professional teaching staff. It is inevitable that there are some problems in the teaching of innovation and entrepreneurship, such as the lack of experience in the industry and the lack of practice in innovation and entrepreneurship. This problem will be more obvious especially in the field of Internet innovation and entrepreneurship. In the short term, it is very difficult to rely on the simple introduction of specific teachers to meet the huge requirement of teaching general innovation and entrepreneurship courses. A more realistic choice is to hire more entrepreneurial personnel and managers with rich experience of innovation and entrepreneurship, especially in the Internet industry, to engage in part-time teaching work. At the same time, the training of innovative entrepreneurship instructors also needs to be strengthened in order to better adapt to the teaching requirement of the future professional Internet innovative education. It is also necessary to put forward a multi-pronged approach in the contemporary higher education environment, which advocates the return to the teaching standard, such as the examination mechanism, the reward mechanism and the construction of the teachers' team, so as to ultimately solve the problem of the construction of the entrepreneurial teachers in Chinese colleges and universities.

The practice of innovation and entrepreneurship

These include two main aspects: Firstly, universities and enterprises, science and technology parks and alumni jointly create an Internet innovation and entrepreneurship education base, and carry out various kinds of practical training courses that are market-oriented and enterprise-oriented with the help of the government. Secondly, universities can hold various activities such as summer school, entrepreneurship forum and innovation and entrepreneurship competition. In 1998, Tsinghua University held the first innovation and entrepreneurship competition. After nearly 20 years of development, all levels of student innovation and entrepreneurship competitions have been formed in China. For example, Business Plan Competition of College Students Challenge Cup started in 1989, and the Internet+ College students Innovation and Entrepreneurship Competition started in 2015 which attracted nearly 10,000 students from all over the country to participate in each session.

Problems and prospects

After years of development, the innovation and entrepreneurship education in China has made great achievements today. There are three typical training models of innovative talents including classroom-oriented mode, entrepreneurial consciousness and skill-lifting mode and comprehensive mode (Ma 2014). As the main body of students' innovation and entrepreneurship, college students have gradually formed a strong willingness to understand society and contact with enterprises. For example, 47.52% of college students have a clear intention to work part-time and 46.53% put into practical action according to the results of the questionnaire (Zhao and Yang 2016). Other scholars used the 2015 data from ASKCI Consulting website and found that the proportion of people under 40 years old in the group of innovation and entrepreneurship in China is as high as 71%, of whom the number of people aged 20–30 has reached 1/3 (Lu 2017). According to the 2017 report on the Entrepreneurship of Chinese College students led by Renmin University of China, accommodation and catering for end-users and consumer e-commerce based on Internet technology have become the main areas of college students' entrepreneurship. Meanwhile, 24.35% of college students think that they want to start their own businesses in high-tech industries such as the Internet (Haina 2018).

At the same time, China is also building a wide variety of Internet innovation and entrepreneurship platforms in all kind of levels. The scope of the service covers the whole life cycle from the development of innovation and entrepreneurship awareness to the transformation of innovation and entrepreneurship achievements. These various service functions include team service, creative service, technical service, financing service, mediation service, interactive communication, etc. It also provides a variety of resource services such as web-based course learning, work resources, teacher resources, expert resources, enterprise resources and knowledge resources.

But we must also realize that as a relatively new form of higher education, there are still many problems and challenges in the development of Internet innovation entrepreneurship education, mainly in the following aspects:

(1) Compared with traditional professional education, Internet innovation entrepreneurship education puts forward higher requirements for the integration of schools and society, and requires the establishment of an all-round and cooperative educational mechanism for participants and process management. The support of student innovation and entrepreneurship needs to be strengthened, and the tripartite cooperation mechanism between government, universities and enterprises needs to be improved. Meantime, the institutional guarantee mechanism of professional teaching staff has not yet been fully improved, and the system of courses and the way of teaching also need to be perfected. The elastic credit system is also the key to ensure that students can achieve innovation and entrepreneurship. The flexible credit system is not just to relax the length of study to allow students to adjust their academic process. The conversion of credit system including student innovation experiments, independent entrepreneurship and online learning of open curriculum requires a unified and clear identifica-

tion of colleges and universities in order to facilitate the implementation of this flexible credit system. In addition, the assessment mechanism of innovation entrepreneurship education also needs to be further studied. It is difficult to measure the level of students' mastery of relevant knowledge of innovation and entrepreneurship by a test paper at the end of the course, and it is more difficult to measure the degree of change of students' entrepreneurial behavior and willingness to start a business, considering the strong practicality and the existence of time-delay effect.

(2) Relevant education methods and personnel training measures need to be changed and improved. No matter from the development time or from the actual results, the innovation and entrepreneurship education system of Chinese higher education is not perfect, and the construction of relevant teaching staff is still insufficient, and the related education quality and education level still have the big space for reform and promotion at present. At the same time, the involvement of industry experts is still insufficient, a variety of related vocational education achieved with the help of trade unions, scientific and technological associations and Internet enterprises and other industry resources also needs to be further strengthened.

(3) Internet innovation and entrepreneurship needs more complete support services, which can provide a variety of social service support systems, including hatching system, training system, investment system, functional service system and brand marketing system. With adapting to the characteristics and requirement of Internet innovation and entrepreneurship, it is necessary to provide entrepreneurs with more workspace, cyberspace, social space and resource-sharing space through a new, low-cost, facilitation, all-factor, open entrepreneurial services platform built by market-oriented mechanisms, specialized services and capitalization channels. All of these will be the key basic work to promote Internet innovation and entrepreneurship education in China. In practice, PPP(Public–Private Partnership) model is also an effective attempt to organize private enterprises, private capital and government, university cooperative education, especially can play a greater role in the resource platform and financial support (Wu et al. 2017).

(4) It is necessary to further enhance the students' understanding of possible failures and make them fully prepared. The high failure rate of entrepreneurial behavior has always been one of the risks that all start-ups have to face. Foreign survey data show that more than 50% of start-ups have a survival life of less than 5 years (Cai and Shan 2010). While this risk is greater in the Internet industry, excessive competition caused by low barriers and the industry's huge airborne intervention may have a more obvious impact on the existing start-up companies. This is even more pronounced for college students. The common problems including be full of entrepreneurial passion but lack of perseverance, lack of professional entrepreneurial knowledge and skills on the Web, lack of entrepreneurial resources and entrepreneurial practice. At the same time, it is also necessary to guide students correctly to avoid blindly following the trend, which is mainly reflected in the choice of Internet entrepreneurial topics. The existing incomplete survey shows that 70% of college students in China focus on Internet takeout and other common forms, and the overall model is relatively monotonous and convergent (Science Press 2018). So the innovation degree of Internet entrepreneurship is insufficient,

or it is only innovative in form, while neglects the attention to the essential content of innovation such as core technology and product service quality.

Acknowledgements This work was supported by Higher Education Research and Reform Development Project of Nanjing University of Finance and Economics (GJ201823), Higher Education Research and Reform Development Project of Nanjing University of Posts and Telecommunications (JG01118JX68).

References

Bai, X. G. (2016). Evolution and enlightenment of innovation and entrepreneurship education in China since reform and opening-up. *Journal of National Academy of Education Administration, 2,* 67–71.

Cai, Y. Z. (2016). Opportunities and challenges of innovation and entrepreneurship in "Internet+" action: An analysis from the perspective of technological revolution and technology economy paradigm. *Seeking Truth, 43*(3), 43–52.

Cai, L., & Shan, B. A. (2010). The impact of venture network on new enterprise performance: An empirical analysis based on the establishment period, survival period and growth period. *Journal of Sun Yat-sen University (Social Science Edition), 50*(4), 189–197.

Chen, X. H., Feng, Z. Y., & Yu, W. W. (2016). Business model transition of enterprises under internet thinking. *Business Economic Research, 10,* 87–88.

Cheng, H. L. (2017). Implementation strategy of innovation and entrepreneurship education in Colleges and Universities under the background of "Internet+". *Journal of National Academy of Education Administration, 5,* 76–81.

Council, N. (2013). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. Washington, DC: National Academies Press.

Drucker, P. (2014). *Innovation and entrepreneurship*. Abingdon: Routledge.

Fan, L. M. (2016). Core literacy of innovation and entrepreneurship: Theoretical research and practical exploration—taking Shanghai University of Finance and Economics as an example. *China Higher Education Research, 10,* 83–87.

Feng, C. Y. (2017). The application of experiential teaching method in innovation and entrepreneurship education. *Journal of National Academy of Education Administration, 7,* 68–73.

Gibb, A. A. (1994). Do we really teach (approach) small business the way we should? *Journal of Small Business and Entrepreneurship, 11*(2), 11–27.

Griffin, P., & Care, E. (Eds.). (2014). *Assessment and teaching of 21st century skills: Methods and approach*. Berlin: Springer.

Gu, M. Y. (2015). Core literacy: The motive force of curriculum reform. *People's Education, 13,* 17–18.

Haina, B. (2018). *China university students entrepreneurship report 2017*. Retrieved May 20, 2019 from http://wemedia.ifeng.com/45959747/wemedia.shtml.

Han, W., & Ouyang, Q. (2007). Tsinghua University: Integrating entrepreneurship education into career counseling. *Employment of Chinese College Students, 10,* 26.

Hong, D. Y. (2016). Creating an upgraded edition of innovation and entrepreneurship education. *China Higher Education, 2,* 47–49.

Hu, B. B., Wang, S. G., & Ren, J. J. (2016). New characteristics of entrepreneurship in the Internet era: Exploratory research based on entrepreneurship by entrepreneurs. *Pioneering with Science and Technology Monthly, 29*(18), 27–32.

Huang, R. X., Wang, Z. W., & Ren, G. F. (2017). The dilemma and solutions of innovation and entrepreneurship education in medical colleges and universities. *Innovation and Entrepreneurship Education, 8*(3), 77–79.

Huang, Z. X., Zhao, G. J., & Tang, W. J. (2015). On the transformation and development of entrepreneurship education in colleges and universities in the era of group innovation. *Educational Research, 36*(7), 34–39.

Jiang, Y. (2015). Intelligent vacuum furnace. *Prosecutorial View, 5,* 96.

Kang, G. D., & Zhang, Y. L. (2016). Practice of innovation and entrepreneurship training in Jishou University under the background of "Internet+": Practice Teaching Reform of discrete structure course of software engineering major. *Higher Education Journal, 12,* 22–23.

Lao, B., & Wu, G. (2018). *Research on experimental teaching model of innovation and entrepreneurship in university of economics and management: Take design and practice of business plan as an example*. Paris: Atlantis Press.

Li, C. Y., Yang, J. H., & Deng, Z. L. (2002). Idea of developing innovation and entrepreneurship education. *Invention and Innovation, 6,* 22.

Liu, Y. B., Ouyang, C. P., & Yang, X. H. (2016a). Exploration of computer innovation and entrepreneurship training mode in the era of "Internet+". *Higher Education Journal, 14,* 15–16.

Liu, G. F., Zhang, Y., & Feng, H. (2016b). Review of core literacy research. *Educational Guide, 3,* 5–9.

Lu, D. X. (2017). Research on innovation and entrepreneurship education in higher vocational colleges under the background of "Internet+". *Guangxi Education, 19,* 28–29.

Ma, X. H. (2014). Eco-civilization of entrepreneurship education. *Education and Occupation, 20,* 95–97.

Ma, H. T. (2016). Suggestions on promoting China's economic and social innovation and development driven by "Internet+". *China's Science and Technology Industry, 3,* 38–39.

Science Press. (2018). *Innovation and entrepreneurship of college students in the "Internet+" era*. Retrieved May 20, 2019 from http://www.sohu.com/a/243645883_410558.

Sun, H. Y. (2010). Four basic issues in the cultivation of innovative talents: Exploration of "3.3.3" curriculum system and 7P teaching mode. *Innovation and Entrepreneurship Education, 1*(2), 8–14.

Timmons, J. A. (1977). *New venture creation a guide to small business development*. Irwin: Irwin Professional Publishing.

Wan, L. Y., & Kang, C. P. (2016). Internet+ creator education: Building a new ecology of innovation and entrepreneurship education in colleges and universities. *Research on Education Development, 36*(7), 59–65.

Wang, Z. R. (2015). The overall conception of innovation and entrepreneurship education concept change in Colleges and universities. *China Higher Education Research, 7,* 75–78.

Wikipedia. (2019). *Entrepreneurship*. Retrieved May 20, 2019 from https://en.wikipedia.org/wiki/Entrepreneurship.

Woshipm. (2016). *White paper on internet innovation and entrepreneurship 2016.* Retrieved May 20, 2019 from http://www.woshipm.com/it/419120.html.

Wu, A. H., Hou, Y. F., & Hao, J. (2017). Take the "Internet+" double creation contest as the carrier to deepen the innovation and entrepreneurship education reform in colleges and universities. *China University Teaching, 1,* 23–27.

Xue, C. L., Lu, C. C., & Li, D. Z. (2016). Review and reflection on innovation and entrepreneurship education in colleges and universities during the 12th Five-Year Plan period: Based on the analysis of third party evaluation report of higher education. *China Higher Education Research, 2,* 20–28.

Yang, B. (2015). The essence of entrepreneurship education is to educate people and rejuvenate the country. *People's Daily,* 19.

Zeng, L., Zhang, Z. Q., & Liu, Y. N. (2012). The strategy of "double-creation" of innovation and entrepreneurship education service in Colleges and universities needs coordinated development. *Education Research, 38*(1), 70–76+105.

Zhan, R., Zhang, K. Z., & Chen, P. L. (2019). Research on the construction of financial experimental teaching system based on innovation and entrepreneurship. *Experiment Science and Technology, 17*(4), 119–124.

Zhang, L. C. (2001). The necessity of alienation of traditional education and the logic put forward by innovative education. *Educational Practice and Research, 2,* 8–10.

Zhang, J., Li, H., & Liu, Y. (2018). Research on the innovative and entrepreneurial ability of higher medical college students: Taking the competition of "Internet+" college students' innovation and entrepreneurship competition in a medical college as an example. *Health Vocational Education, 36*(6), 10–11.

Zhao, J., & Yang, K. Y. (2016). The research on the functional construction of innovative entrepreneurial-information platform in internet environment: Such as the college students' innovative entrepreneurial education. *Information Science, 34*(5), 59–63.

Zheng, Y. L., & Li, L. Y. (2014). Creative-based learning with technical support: Connotation, characteristics and implementation path of creator education in American primary and secondary schools. *Open Education Research, 20*(6), 42–49.

Zhu, Y. X., & Yang, S. B. (1999). Outline of innovative education. *Educational Research, 8,* 8–15.