

# Construction of Innovation and Entrepreneurship Education and Practice Base in University— Based on HIT Racing Team

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## Abstract

Cultivating college students' innovation and entrepreneurship is the most important part of college education. Meanwhile, the education and practice base for innovation and entrepreneurship is an indispensable teaching platform to enhance college students' consciousness of innovation and entrepreneurship. Focus on the reformation of college education and college students' competitiveness in employment, this paper is about analysis of the development of bases, discussion of the importance of bases and coming up with ways of the construction of bases. And the practical exploration is based on HIT Racing Team, which proves quite good.

**Keyword:** *Innovation and Entrepreneurship; Consciousness of Innovation; Education and Practice Base; Training System*

## 1 INTRODUCTION

Innovation and entrepreneurship are the trend in Chinese economic and social development. Chinese president Xi Jinping has stressed that to achieve the 'the thirteenth five-years plan', to resolve the problems in development and to maintain the advantages in development, it's essential to have a new concept of development, which represents innovation, coordination, sustainability, open mind and sharing. China has taken the innovation as the soul of the nation and one of the five key elements in development strategy in the process of establishing the thirteenth five-years plan. So, college students as high-level talents are indispensable in the process of mass entrepreneurship and innovation. As Chinese premier Li Keqiang saying that college students are driving forces to implement the strategy of the development which is driven by innovation and contribute to the mass entrepreneurship and innovation, so it's necessary to study hard, master more knowledge, devote to innovation and entrepreneurship and improve practical ability [1]. Thus, it's urgent to construct an education and practice base for innovation and entrepreneurship in each university.

## 2 THE BACKGROUND AND SIGNIFICANCE OF THE CONSTRUCTION OF EDUCATION AND PRACTICES BASE FOR INNOVATION AND ENTREPRENEURSHIP

Nowadays, the number of the jobs in the society is relative steady, but the number of the graduates are rapidly growing, which leads to more severe job competition, lower employment rate in graduates and the conflicts between market and employment [2,3]. In the summer Davos forum on September 2014, Chinese Premier Li Keqiang called for "mass entrepreneurship and innovation". In 2015, the State Council has issued a document called "The Decision of the State Council Regarding the strategies of prompting mass entrepreneurship and innovation", which contributes to mass entrepreneurship and innovation to a climax. Mass entrepreneurship and innovation will provide more job for the society, which is a good to relief the employment pressure. In this social background, more and more people begin to concern the situation of the college students in innovation and entrepreneurship. After graduate, it's indispensable for graduates to have the ability to innovate and start their own business to walk into the society. China has continuously put up with

preferential policies for college students to start their business and local governments have also established incubators and entrepreneurship training centers to provide support and help for them.

From the perspective of the university, it's the most important part in higher education to cultivate the ability of innovation and entrepreneurship. To respond to government's call and enhance college students' competitiveness, we tried to establish our own education and practice base for innovation and entrepreneurship. Here is significance of the base.

### ***2.1 Satisfying the Students' Needs of Self-development***

In recent years, increasing enrollment in university leads to severe employment competition and meanwhile, companies prefer employees with many skills. To stand out in the competition, college students need to continuously learn new knowledge and skills, cultivate their creative spirits and inspire their enthusiasm for entrepreneurship to expand their future space for development. At the base, college students can get the guidance, capital, equipment and technical support from school. And in the practical process, they can improve their abilities, broaden their horizons, gain lots of experience and communicate with each other, which proves that it's a quite good platform to meet their need of self-development.

### ***2.2 The Trend of Reformation of the Universities***

Construction of the education and practice base for innovation and entrepreneurship is the trend of the reform of Chinese universities. To adapt to the rapid development of the society, universities have to cultivate high-tech talents with creativity in time. And the base is a good platform to do it. The graduates with innovation and entrepreneurship will be more competitive, which will contribute to the popularity of the universities and enrolment in the future.

### ***2.3 The Demand of the Reform of the Higher Education***

Higher education that aims at cultivating special talents, prompting the development of the technology and meeting the needs of the construction of modernization is an important part in the education system. The key task of the development of the higher education is to improve the quality of the teaching, which is the demand of the construction of the powerful country in education [4]. Therefore, higher education has to cultivate talents that needed by the development of the society. And in this process, it's indispensable to inspire students' consciousness of innovation and entrepreneurship in their all-round development. Thus, the base, which is an important platform to carry out innovation and entrepreneurship education can enrich their knowledge of entrepreneurship and improve their abilities to innovate and venture to adapt to society better [5].

## **3 THE ANALYSIS OF THE PROBLEMS IN THE EDUCATION AND PRACTICE BASES FOR INNOVATION AND ENTREPRENEURSHIP**

### ***3.1 The Condition of Domestic Education and Practice Bases for Innovation and Entrepreneurship in Universities***

Recently, governments have attached great importance to the construction of the bases, which leads to preliminary success in most universities in China. Although the results seem good, there are also many problems, which are not neglectable, and large room for improvement. Here are some typical problems:

#### ***1) Lack of Resources***

Not only teachers but also funds are in shortage in most education and practice bases for innovation and entrepreneurship. Besides it, most advisors in those bases are temporary in charge because of lack of professional advisors, which would be obstacle for college students who tempt to try it [6]. And insufficient financial funds can only support a few projects and discourage other participants [7].

#### ***2) Formalism***

There may be many entrepreneurship teams in an education and practice base but few are actually doing something. In fact, many teams just take rooms as their offices or study room [2], which means they actually don't want to start their

own business but just to win a prize by their fancy ideas. The problems are that after a show on the stage there is no supervision in the process, which is the most key part in entrepreneurship.

### *3) Lack of Support from the Society*

In the system of the university, there are lots of projects resources such as infrastructure, scholarship and researches, which are funded by society. But from now, there are few funds on entrepreneurship, which is quite a big drawback. Because companies are the teams, which managed to go through it. Their involvement will undoubtedly contribute a lot to their entrepreneurship and easing the pressure on the fund [8].

### *4) Lack of the consciousness of innovation and entrepreneurship*

With a nice atmosphere, the sense of innovation and entrepreneurship has been strengthened, but there is still a quite long way away from mass entrepreneurship and innovation said as premier Li Keqiang. Affected by the traditional culture and educational mode, most students intend to listen to what teachers say and do as teachers bid, which means lack of active thoughts and braveness during entrepreneurship. So, it's quite essential to pay attention to the ideological education [9].

## ***3.2 The Condition of Foreign Education and Practice Bases for Innovation and Entrepreneurship in Universities***

### *1) America*

As the earliest country start the innovative and entrepreneurial education, it has been a more than sixty years history so far, which means the advanced theoretical and practical education mode [10]. There is an evolution from seminar and teaching to innovation and entrepreneurship [11].

According to Cauffman's reports in 1999, ninety-one percent people in American think that it's a respectable job to start a business. And there is a man who want to start his own business among every twelve men. Nowadays American graduates who start their own business count for 25%, which is much more than other countries.

American Entrepreneurship and Innovation Association thinks that entrepreneurship and innovation should be a process, which needs a life-long study including primary education to higher education, a comprehensive and integrated education system.

Here are some features of American innovation and entrepreneurship education: a). A relatively well-developed regulatory system. b). Specific cultivating objectives. c). Outstanding teaching teams. d). Colorful and practical teaching activities. e). Systematic courses [3].

### *2) Japan*

In Japan the original intention of innovation and entrepreneurship education is to encourage students to start their own business to relief the economic slowdown and reduce the impact of global economic crisis. So, it's clear that the utilitarian aim of it is to stimulate the economy. But as time goes by, this kind of education has changed from a utilitarian one to a routine one.

We can divide the present education into three parts: education aimed at high school students, education aimed at college students and entrepreneurship training leading by local governments and associations.

Here are some features of Japanese innovation and entrepreneurship education: a). Leading by the government, universities and society assist in this kind of education. b). Regional differences. c). Systematic education system. d). The strategy of venture business contributes a lot to innovation and entrepreneurship education.

### *3) Britain*

In 1982, the establishment of British college student entrepreneurship project announced the beginning of the innovation and entrepreneurship education to ease the pressure of employment on the government. Since its beginning, the rate of employment has increased effectively and more students choose to start their own business, which creates more job and ease the pressure further. Later, due to the decrease of the unemployment and the increase of the cost, British government

stopped the project in 1990. Then, the goal of the innovation and entrepreneurship is to cultivate entrepreneurial quality and popularize the knowledge of the development of companies. In 21<sup>st</sup> century, the goal has changed to form an entrepreneurial atmosphere in the society and harmonious environment in companies.

Having gone through so many years, the popularity, course arrangement and practical activities are relative mature [12]. But British graduates is more conservative than American graduates who is fearless and adventurous. And courses for innovation and entrepreneurship education are mainly business courses, kinds of which are a few. Besides it, unbalanced regional development also needs to be solved. Even though, the amiable atmosphere of innovation and entrepreneurship and complete ancillary equipment, which are worth learning.

## **4 WAYS TO CONSTRUCT INNOVATION AND ENTREPRENEURSHIP BASES**

### ***4.1 Optimize Innovative People Cultivating Plan and Enhance Innovative and Entrepreneurial Educational Idea***

If college students don't have innovative idea and entrepreneurial spirits of struggle and practice, no matter how good the environment is, the construction of the bases is meaningless and formalism. Innovation contributes to entrepreneurship and entrepreneurship contributes to employment [13], which means that we should promote reform toward innovative people cultivating system. So, optimizing cultivating plan and improving curriculum arrangement according to industry demand, to improve the quality of cultivation and employment.

Firstly, integrate and optimize core courses, compress the total credits of graduation, give students more time for innovation, set up innovative and entrepreneurial education modules in core courses, and integrate innovation and entrepreneurship thinking into all aspects of teaching. Then carry out major and minor system widely and establish personalized cultivating system to simulate the students' potential, allow them to obtain better development opportunities and lay a more comprehensive theoretical foundation for innovation and entrepreneurship.

Secondly, promote the certification of engineering education, cultivate students' sense of innovation and the ability to solve complex engineering problems, and establish a system and culture, which contribute to continuous reform, to achieve the core task of improving students' comprehensive ability and guarantee quality and vitality of the teaching.

Universities with local governments, industry enterprise and research institutes jointly implement the cultivation of innovative and entrepreneurial talents, improve the "full-time" education guidance service mechanism for college students' innovation and entrepreneurship education, and promote the staged growth of college students' awareness and ability of innovation and entrepreneurship.

In addition of the curriculum education method, in order to create an innovative and entrepreneurship atmosphere in the school, more appropriate activities should be held, such as holding an in-school innovation and entrepreneurship competition, setting up a university student innovation and entrepreneurship association, holding a business knowledge lecture, etc. Give rewards and encourage to students, who perform well to promote innovation and entrepreneurship.

### ***4.2 Establish a Sound Innovation and Entrepreneurship Education Support and Guarantee System***

The practice base support and guarantee system is mainly divided into three parts: organization and mechanism guarantee, funding guarantee and other aspects. In terms of organization and mechanism guarantee, attach importance to the position of the construction of practice bases for innovation and entrepreneurship in colleges, take it as an important part of the school's teaching project and establish an expert working group that is in charge of the planning and promoting the construction of the practice base. At the same time, establish a sound coordination mechanism for innovation and entrepreneurship education involving teaching, finance, personnel, employment, scientific research, Youth League Committee, university science parks, etc. to come up with practical management methods and supporting policies to clarify the division of labor and increase personnel, venues, and funds input. Then incorporate the daily management of the practice base into the teaching management system to form a long-term mechanism. In terms of finance guarantee, in order to ensure the normal operation of the innovation and entrepreneurship base, the school should raise funds through various channels to ensure the fund for the construction and operation of the base. Moreover, innovative and entrepreneurial projects that have passed the project review in the base should be given corresponding

financial support. In terms of other aspects, the demonstration experimental teaching center, various open laboratories and key laboratories at all levels in the school shall provide experimental sites and experimental equipment to the students of the practice base. The school shall also provide other technical supports, suitable base environment and etc. At the same time, universities should broaden their thinking, integrate resources inside and outside the school, build a diversified practice base for innovation and entrepreneurship education and create more opportunities for students to participate in the process of innovation and entrepreneurship.

#### ***4.3 Build a First-class Team of Innovation and Entrepreneurship Education Teachers***

Teacher resources are very important in the base but are often easily overlooked. College students' innovation and entrepreneurship cannot be separated from the guidance and support of professionals. Universities and bases must systematically support instructors to work in enterprises, encourage teachers to participate in the practice of innovation and entrepreneurship in the social industry and accumulate experience in innovation and entrepreneurship. At the same time, we should actively hire entrepreneurs and entrepreneurial successes, experts and scholars from all walks of life as part-time teachers to establish a team of high-quality innovation and entrepreneurship education teachers. From the aspects of teaching assessment, title evaluation, cultivation and financial support, we should provide inclined support and regularly organize teacher cultivation and communication to continuously improve teachers' teaching skills and ability to guide students to innovate and start their own business. If possible, encourage the base to establish a teaching and research sector or a corresponding research institute for innovation and entrepreneurship education.

#### ***4.4 Make Full Use of Social Resources to Help Build Innovation and Entrepreneurship Bases***

It is certainly not enough to rely on resources of the school to support students' innovation and entrepreneurship. Whether it is in terms of capital or platform, it is far from enough. As a university, it should correctly recognize its own deficiencies and actively seek support from social resources, such as college alumni, social support and non-governmental organizations. And the ways to support can be varied such as funds, technology, professionals, or practical opportunities and platforms. But they all can provide great help and make the base more diversified, which broaden the students' horizon to better adapt to the society.

#### ***4.5 Establish a Strict Supervision, Management and Evaluation System***

In order to avoid the waste of resources by some students without intentions to venture and to supervise the innovation and entrepreneurship of students, colleges and universities should establish a strict base management and supervision system.

First of all, the innovation and entrepreneurship teams that have settled in the base should be strictly checked, and the inspection should be strengthened to raise the entry threshold, so as to leave the resources to the entrepreneurship teams that have ideas and are willing to do things. Second, after the establishment of the base, the school should also strengthen the supervision management, not to give students too much freedom, to give guidance and help to the innovation and entrepreneurship teams. In the process of base supervision, Education and warning should be given to teams that occupy resources but fail to carry out innovation and entrepreneurship. Develop strict rules and regulations [14], including entry criteria, incentives and penalties for base operations.

## **5 THE INNOVATION AND ENTREPRENEURSHIP EDUCATION BASE HAS ACHIEVED INITIAL RESULTS**

### ***5.1 Based on HIT Racing Team (HRT), the Innovation and Entrepreneurship Education Practice Base for all Students is Established***

Harbin Institute of Technology at Weihai has built an innovation and entrepreneurship base for HRT covering an area of 6,700 square meters. HRT was established in 2009, and now there are four sub-teams, namely, a combustion team,

an electrical team, a Baja team, and an unmanned vehicle team, which operate independently and cooperate with each other, as shown in Fig. 1. In recent years, HRT has been actively striving for multiple resources, constantly improving the management system and organize training regularly to build a first-class innovation and entrepreneurship team.

The innovation and entrepreneurship practice base for HRT is highly valued by the school. The base construction is incorporated into the school teaching work system and an expert working group is set up to deploy and manage the construction and the development of the base. In terms of funding, the expert working group set up a special financial department, responsible for the daily financial management and provided sufficient research and operational funding. In addition, the school provides a number of technical and material support. In terms of technology, a number of laboratories and laboratory equipment are open to HRT members and there are professional technical instructors to guide them. In terms of material, the 6,700 square meters of innovation and entrepreneurship space, air-conditioning, 3D printers, electric heaters for carbon fiber products and many other tools do contribute a lot to them.



FIG. 1 HIT RACING TEAM

### ***5.2 School-Base-Enterprise Cooperated Innovation and Entrepreneurship Education Mode***

Our school attaches great importance to the construction of the innovation and entrepreneurship base for HRT and equips the base with a team of professional and experienced instructors from the Faculty of Automotive Engineering, Economics and Management, Computer and Software. Routine meetings are regularly held combining with targeted training, guidance and communication by instructors. Close communication between students and teachers lays a solid foundation for the development of the base.

In order to cultivate the team members' innovative idea and entrepreneurial spirit and to encourage the team members to pass the period of trough, there are professional courses for team members in the base.

HRT based on the campus, makes full use of social resources, through the alumni strength and its own influence in the student formula of China, having received support from many enterprises and institution in the society. The sponsors provide the funds, materials or technical support to the base every year. The base gives the sponsors corresponding advertising feedback, including trademarks on the cars and various kinds of new media advertisement and other feedback. HRT has maintained a good cooperative relationship with the sponsors and the total amount of funds and materials sponsored each season can reach more than 100,000 yuan. In addition, the sponsors are willing to provide visit, practice and job opportunities for HRT members.

### ***5.3 Scientific Management and Supervision System Ensure Efficient Operation***

There is a scientific management supervision system in HRT. For the daily work of the team members, we use a working time system by using fingerprints to sign in and out. Counting working hours every week, punish the ones who worked

less than 18 hours last week and reward the one who had most working hour last week. A weekly meeting is held to review the work progress, arrange the next week's tasks, and evaluate the team's work. The base also implements a strict appraisal system, which regularly evaluates the team members' work. Members who have not passed the assessment will be asked to drop out of the team. Under this system, HRT can maintain efficient operation, solve the problem of redundant personnel, and enable each team member to do their best. Taking the unmanned driven car team as an example, this team persists in the principle of flattening, which means to reduce the number of the management classes, to be efficient and to avoid staff redundancy.

#### ***5.4 HRT Has Achieved Outstanding Results and Students' Ability Has Been Greatly Improved***

In the past three years, our students have published more than 20 papers and obtained more than 10 patents. They have won more than 100 awards for various innovation and entrepreneurship competitions and discipline competitions at the provincial or municipal levels, as shown in Fig. 2. HRT also has participated in international Student Formula in America, Germany and Japan, and won more than 20 awards. In 2016, HRT won the National Championship in FSEC and Baja SAE China, which was the first double Championship in China. In the same year, HRT also won the Innovation Award held by the National Development Bank, Industry and Information Innovation and Entrepreneurship held by the Ministry of Industry and Information and Top 10 Outstanding Technology Innovation Team in Harbin Institute of Technology. In 2017, HRT won many international awards such as the First in Efficiency of SFJ, the First in Lightweight Design and the Third in Design in SFJ. Some graduate from HRT have gone to universities in domestic, Germany and Japan to continue their studies. Others have held important positions in well-known enterprises and institution in China and the employment rate has reached 100%.



FIG. 2 AWARDS OF INNOVATION AND ENTREPRENEURSHIP COMPETITIONS

## **6 CONCLUSION**

It's clear that the education and practice base for innovation and entrepreneurship is a very effective way to improve the quality of graduates and solve the problems of employment. So, it's necessary to build its base in each university. But only relying on the universities is far from enough to finish the construction, which means that social resources and government should involve in it. After construction, it's also very difficult to use it efficiently. Then, it's important to learn management and teaching experience form foreign and domestic universities and explore our own ways to do it. And it's indispensable to have a supervision mechanism to guarantee efficiency. HRT is a relative successful example of innovation and entrepreneurship teams in our school. All members in HRT has gained a lot of skills and abilities through this platform. And most importantly, more and more companies have begun to recognize HRT and members in it, which is the most convincing evidence that the education and practice base for innovation and entrepreneurship is actually a good way to cultivate excellent college students.

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