A Tentative Approach to the Cultivation of Maker Talents in Universities

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Abstract. Makers are promoting and leading an industrial reformation of the “Maker-Age” in the “Internet +” era. Universities are the main front of the cultivation of innovative talents. Cultivation of innovative talents is the inevitable trend of innovation education in the new situation. The paper puts forward the cultivation of maker talents on the basis of demonstrating the definition and characteristics of maker talents, and analyzes cultivating paths of maker talents from four perspectives, which are maker activities, maker space, maker education and maker culture.

Introduction

With the development of the time and the society, China has stepped into a “crowd innovation era” with “mass entrepreneurship and innovation”, which is bound to be a “double-engine” for the continuous development of Chinese economy in the “new normal” situation. Appearing with the new social background, makers are gradually growing into important new blood for promoting social reformation and economic transformation, which also gradually makes maker education a key part of university reformation and development. As the main front of talent cultivation, universities should adapt to the new situations and new requirements, to take the cultivation of maker talents as their goal, launch maker activities continuously, create maker atmosphere, establish maker space, carry out maker education, cultivate, guide, and support the development and prosperity of maker culture, thus to deepen innovation education in universities.

1. Cultivation of Maker Talents

1.1 Definition and essential characteristics of maker

“Maker”, a word derived from English, general and narrowly defined by the “Chinese Maker White Paper 2013” published by Sohu. The general definition of the “maker” refers to those who transform their ideas into real things and are willing to share, which is a broad sense. The narrow definition refers to those who materialize their ideas by source hardware and software, which is not only the kind of maker described by Anderson in his book Makers: The New Industrial Revolution, but also the main direction that makers in home and abroad are moving forward. I believe “maker” refers to someone who is eager for innovation out of his interest and hobby, and turns his inspirations and ideas into reality through the instruments at hand. Makers are the new human beings who insist on innovation and persevere in practice, willing to share and in pursuit of a beautiful life. They are the “players” of innovation [1]. The four typical characteristics of “makers” are as follows:

a) Idea is the foundation. Makers are who they are firstly due to their ceaseless ideas and inspirations, which are also their soul. In the ever-changing and ever-developing modern society, people are more and more inclined to individualized development, and in pursuit of fashion, creation, and uniqueness, offering solid roots for makers to be born and grown up.

b) Practice is the label. Makers are innovative talents in the Internet era, with not only infinite fancy and whimsy ideas, but also impressive operational capabilities. They dare to think and
practice, to convey ideas into real pieces of work through their implements and resources. They are real doers, which makes practice their label.

c) Sharing is the key. Makers are distinct from common innovative talents and entrepreneurs not only in their enthusiasm for innovation, courage of practice, ability of creation, but also in their willingness to share. Makers never isolate themselves or fight alone. They embrace openness, sharing, and communication. Maker space is their mutual stage and battlefield.

d) The Internet is the carrier. As the new blood for social transformation, makers are to possess a wider and wider influence. The rapidly changing Internet technique serves as a broad platform for makers to communicate, exchange, and promote maker culture. Makers need to multiply their communicative paths by means of “we media” platforms, such as the Internet, micro-blog, and WeChat, thus creating the innovative and entrepreneurial atmosphere from “dots” to “lines”, and from “lines” to “planes” [2].

1.2 Cultivation of maker talents

Currently, with the promotion of social and scientific development, traditional scientific innovative modes are in the transformation: traditional scientific innovative activities, whose orientation is technological development, subject are scientific workers, and carrier is the lab, are changing towards user-participating innovation 2.0 mode whose center are customers, stage is social practice, characteristics are joint and open innovation 0. In March 2015, “maker” was adopted into the government work report for the first time in the Third Meeting of the Twelfth Nation People’s Congress. Later, the State Council published Guidelines on the Promotion of Crowd Innovation and Entrepreneurship by the Development of Maker Space, which put up with the construction of a batch of maker space with low cost, facilitation, total-factor and openness, making “makers” the focus during the National People’s Congress and the Chinese People’s Political Consultative Conference. Though a new kind of force in China, makers have achieved rapid development, and are playing a more and more essential role, and attracting more and more attention.

Makers’ pursuits for new things, exploration and innovation suit for the needs of student individuality; their indifference to fame and belief orientation meet the requirements of talent cultivation; their bravery against obstacles, perseverance for practice and courage of adventure meet the goals of education [4]. All of these have injected vigor into education, which has become the power of educational development and reform. Makers conform to the objective needs of the cultivation of innovative talents. Their innovative and practical perceptions give impetus to the transformation of the educational pattern and the reformation of talent cultivation pattern. As the main garden for maker cultivation, universities are in the absolute trend of raising talent cultivation goals, and in the thorny path of fostering makers who uphold innovation, adventure, practice and sharing.

2. Path Analysis of Makers Cultivation

2.1 Spot the breakthrough point: launching maker activities, creating maker atmosphere

With the development of various Internet technologies, maker activities, whose core is to turn ideas into real staff and turn an ordinary man into a dream achiever, surge around the whole world. Maker activities are exerting a profound influence on the economic and social development, as well as the subversion of traditional educational and learning methods. The 2014 American Horizon Report (High Education Edition) published by New Media Alliance predicted that in the following 3-5 years, students are transforming from knowledge consumers into knowledge creators, which can be positively verified by the burgeoning maker activities in the educational world [5]. Maker activities are popping up in various forms all over American basic and higher educational world. In China, maker activities serve as a bridge between the national strategic initiative of “mass entrepreneurship and innovation” and every common individual’s own dreams, thus are bound to ignite the fire of young students’ innovative and entrepreneurial enthusiasm. To accomplish the goal
of cultivating maker talents, universities must pin down the breakthrough point as launching maker activities and creating maker atmosphere, thus supplying students with courage, confidence and decisiveness to find the platforms for their ideas, and struggle to decorate their youth. Universities should firstly try to create public atmosphere by advocating makers and their activities, so as to reach the consensus among the faculty and students of cultivating makers in universities, and to impel the conception of maker activities to sink in. Then universities should positively establish carriers for maker activities so as to allow more and wider participation of these activities. Maker activities will change students’ learning style in universities.

2.2 Grasp the key point: establish maker space, broaden maker platform

The creation and power of makers originate from their sharing, mutual assistance and cooperation, which make a platform necessary for them. Maker space is such a gathering platform of makers with common interests. It serves as the basic organizational unit of makers, as a social platform where makers are capable to materialize and communicate about their ideas, with the combination of the off-line and on-line of products, and the combination of innovation and socialization. Maker space requires little material luxury, but more in providing a kind of environment where every participator enjoys the opportunities to freely communicate and explore the unknown [6]. Endowed with sophisticated and collective talents and intellectual resources, universities are also a vital base for the education, cultivation and training of maker talents. The key point of maker talent cultivation for universities is to establish maker space according to the features of the universities and also of students, to nurture students’ ideas, to provide a fixed venue for maker activities and communication, to make full advantage of maker space such as open labs, training rooms, student society rooms, and libraries, thus satisfying students’ needs of innovative interdisciplinary practical programs, of the promotion of technological application and of the communication of ideas, as well as making maker space the gathering spot of innovative ideas and the test field for dreams. Universities should forge the maker space as a crowd innovation space oriented towards marketization, professionalization, integration and the Internet, as a platform and carrier of public services for university entrepreneurs by creating a completed entrepreneurial incubating chain of “pre-business - entrepreneurial nursery – incubator - accelerator”, so as to make maker space an entrepreneurial paradise for makers with entrepreneurial ambitions and ideas, also an important impeller to convey universities’ advantage of innovative resources to the rapid innovative development.

2.3 Seize the acting point: launching maker education, nurturing educated makers

Maker education is an educational innovation in the educational circle under the wave of maker activities. Inheriting the student-centered ideology, with the blend of technology, maker education has opened up innovative educational stages, extended educational chains of innovation and entrepreneurship, accomplished the linkage of innovative conception fostering, creative practicing and enterprise incubating. Universities should be the main field for maker education. To achieve maker talent cultivation goals, universities need to give tremendous support to maker education, combining the features of professions and posts, to lead professional education reformation from the perspectives of “individual needs, education centering, and platform establishment” [7]; based on the three-dimensional maker educational pattern of “dot-line-plane”, to inspire students’ interests and aspirations, and to explore a new path of maker education consisted of innovative, creative, and entrepreneurial education. Maker education requires the balance of “class” and “practice”: on the one hand, class should be the starting point, which demands to constantly deepen the innovative reform of the class, and strengthen the construction of the theoretical knowledge system of innovation and entrepreneurship; on the other hand, practice should be the guidance, which demands trans-disciplinary, trans-regional, and trans-industrial practical training to enhance students’ professional skills and the development of their overall qualities, and patient nurturing to nourish the subterranean seeds of being a maker as well as wait for the shooting of sprouting. Exploration and practice on different educational contents, faculty, teaching methods, evaluation modes and experiences should be employed in progressive maker education. University students’
needs of maker education and practical activities should be satisfied by the deeper exploration into innovation and entrepreneurship of various degrees.

2.4 Acknowledge the supporting point: fostering maker culture, achieving long-term development

In 2015, Li Keqiang proposed on the Executive Meeting of the State Council to “improve entrepreneurial guiding system, launch entrepreneurial training camps and competitions so as to foster maker culture and atmosphere”. Only to foster maker culture and make “maker” a sort of belief and culture can allow the long-term development come true. As what Piaget said, the purpose of education should be to cultivate men who can create new things rather than repeat what the former generation has already done. These men should be creative, exploratory and keen to discovery [8]. This is both the educational content of maker culture and educational goal of creating new things. Maker culture has now taken a deep root in education, from policies to practice, in America. Like other newly burgeoning groups, makers are going through the progressive phases “from dormancy to eruption” now in China with the accumulation and dynamism of maker culture. Tsinghua University has celebrated the last Saturday of every November as Tsinghua Maker Day since 2014 to advocate maker culture, which is a profitable experiment of maker culture. Innovative activities like “Maker Forum”, “Maker Contest” or “Maker Carnival” of certain scale organized by universities can exert a greater influence, even on the media, on the public, drawing more participators of “maker culture”, thickening maker atmosphere on campus, and transforming “maker” into a captivating ideology and spirit. Universities’ nourishment of maker culture is a fundamental cultivation of entrepreneurial culture, and a significant measure to steer and support university students’ entrepreneurship and employment. Currently, with the ever-thickening entrepreneurial atmosphere, as well as the ebbs and flows of innovation capital, we need to cultivate the culture that, instead of exasperating the fickle and unpractical social atmosphere, seizes the educational essence of students’ learning and development, and directs youngsters to foray into the maker world with reason, order and practicality.

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